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Thomas A Edison Papers

A SELECTIVE MICROFILM EDITION

PART IV
(1899–1910)

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START

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Notebook, N-01-04-16

This undated notebook is a continuation of N-01-04-15. It contains notes by Edison and an unidentified experimenter regarding trials of various alloys for use in thermocouples. The metals tested include bismuth, cadmium, lead, and tin. At the beginning of the first entry Edison wrote,"Thermo 2nd Book." The spine is stamped "153." The pages are unnumbered. Approximately 20 pages have been used.

Thermo Eph.

Thermo 2nd Book

Alloy
Pb 90
Bi 10

5	95	1.4
10	90	.9
15	85	.8
20	80	.8
25	75	.8
30	70	.5
35	65	.5
40	60	.6
45	55	.7
50	50	.6
55	45	.5
60	40	.4
65	35	.3
70	30	.2
75	25	.1
80	20	1
85	15	0
90	10	0
95	5	.3

Pt 85
Pi 15

5	St 95	1.6
10	90	1.2
15	85	1
20	80	.5
25	75	.5
30	70	.5
35	65	.6
40	60	.5
45	55	.7
50	50	.5
55	45	.5
60	40	.5
65	35	.4
70	30	.3
75	25	.2
80	20	.2
85	15	.1
90	10	0
95	5	.1 opposite

Alloy
Cd 70
Bi 20

5	Sb 95	3.7
10	90	3.8
15	85	4.
20	80	4.8
25	75	4.3
30	70	6.9
35	65	5.
40	60	5.7
45	55	6.8
50	50	8.5
55	45	8.4
60	40	2.9
65	35	2.3
70	30	2.8
75	25	.7
80	20	.5
85	15	.3
90	10	.2
95	5	.1

Cd 65
Bi 35

5	95	3.6
10	90	3.8
15	85	4.
20	80	4.1
25	75	4.9
30	70	5.1
35	65	5.6
40	60	5.9
45	55	6.2
50	50	7.
55	45	7.1
60	40	5.
65	35	3.5
70	30	1.2
75	25	1.1
80	20	.5
85	15	.2
90	10	.1
95	5	0

alloy

Cd 5
Bi 95

	Sb	
5	95	2.8
10	90	2.5
15	85	2.5
20	80	2.7
25	75	2.3
30	70	2.1
35	65	2.1
40	60	1.5
45	55	1.
50	50	.5
55	45	.2 opposite
60	40	.8 "
65	35	1.2 "
70	30	2.5 "
75	25	3.5 "
80	20	4. "
85	15	5 "
90	10	5.7 "
95	5	6.1 "

Alley
Ed. 16
Bi 90

5 St	95	3
10	90	2.9
15	85	3.
20	80	2.9
25	75	2.5
30	70	2.7
35	65	2.4
40	60	2.
45	55	1.8
50	50	1.8
55	45	1.5
60	40	1. opposite
65	35	1.2 "
70	30	2. "
75	25	3.5 "
80	20	4.3 "
85	15	4.6 "
90	10	5.6 "
95	5	4.9 "

Alloy

Cd 15
Bi 85

	Sb	
5	95	3
10	90	3
15	85	3
20	80	2.9
25	75	2.9
30	70	2.8
35	65	2.8
40	60	2.4
45	55	1.5
50	50	1.
55	45	.6
60	40	1.
65	35	1. opposite
70	30	1.9 "
75	25	2.8 "
80	20	3.9 "
85	15	4 "
90	10	4.9 "
95	5	3.9 "

Alloy

Cd 20
Bi 80

5	95	3
10	90	3
15	85	3.2
20	80	3.1
25	75	3.1
30	70	3.
35	65	3.2
40	60	2.5
45	55	3.
50	50	1.9
55	45	2.
60	40	.8
65	35	.1
70	30	1 opposite
75	25	3 "
80	20	1 "
85	15	3.5 "
90	10	2.4 "
95	5	2.9 "

alloy

Cd 25	5	Sb 95	3.3
Bi 75	10	90	3.1
	15	85	3.2
	20	80	3.4
	25	75	3.2
	30	70	3.
	35	65	3.5
	40	60	3.1
	45	55	3.
	50	50	2.9
	55	45	2.8
	60	40	1.5
	65	35	2.1
	70	30	1.6
	75	25	1.5
	80	20	.5 opposite
	85	15	.5 "
	90	10	.6 "
	95	5	1 opposite

Sb 80	5	Sn 95	
Ni 20	10	90	
	15	85	
	20	80	
	25	75	
	30	70	
	35	65	
	40	60	.1
	45	55	
	50	50	.1
	55	45	
	60	40	0
	65	35	
	70	30	0
	75	25	
	80	20	.1 opposite
	85	15	
	90	10	.1 "
	95	5	

Alloy

Sb 90
Ni 10

	Sn	
5	95	
10	90	.5
15	85	
20	80	.3
25	75	
30	70	.3
35	65	
40	60	.2
45	55	
50	50	.1
55	45	
60	40	0
65	35	
70	30	0
75	25	
80	20	.1 opposite
85	15	
90	10	.1 opposite
95	5	

Alloy	Zinc		
Sn 90	80	20	0
Ni 10	70	30	.1 opposite
	60	40	.1 "
			0
Pb 90	Zinc		
Ni 10	80	20	0
	70	30	0
	60	40	.1 opposite
	50	50	.1 "
	40	60	.2 "
Sb 80	Zinc		
Ni 20	90	10	0
	80	20	.1
	70	30	0
	60	40	0
	50	50	1.5
	Cadmium		
Sb 80	90	10	.1
Ni 20	80	20	.1
	70	30	.1

Sb 90	Sb		
Ni 10	50	50	1.9
	25	75	1.5
	Pb		
Sb 80			
Ni 20	90	10	.1 opposite
	80	20	.1 "
	70	30	.1 "
	Bi		
Pb 90			
Fe 10	90	1	0
	80	20	1
	70	30	.9
	60	40	1.1
	50	50	.1 opposite
	Sn		
Sn 80			
Ni 20	90	10	0
	80	20	.1 opposite
	75	25	.1 "
	Sb		
Sn 80			
Ni 20	90	10	
	80	20	.4
	70	30	.9
	60	40	1
	50	50	.1

Sn 90
Ni 10

Sb

90	10	1.1
80	20	.8
70	30	.5
60	40	.4
50	50	.3
40	60	.1
30	70	0
20	80	0
10	90	.1 opposite

Sb 90 Fe 10

fine

90	10	
80	20	0
70	30	.1 opposite
60	40	.1
50	50	0

Sb 80 Fe 20

fine

90	10	.1 opposite
80	20	0
75	25	.5
70	30	.5

Sb

Guic 90 Cobalt 10	95	5	2.9
	90	10	3.1
	85	15	2.4
	80	20	4.9
	75	25	4.2

Bi

Sb 80 Ni 20	90	10	2.5
	80	20	6.8 opposite
	70	30	3 "
	60	40	4 "
	50	50	3.5 "

Bi

Pb 80 Fe 20	90	10	.1
	80	20	1
	75	25	1
	70	30	1.5

Sn 90 Ni 10 — Sn 90 Ni 10 ~~Guic~~ — Zinc

	90	10	0
	80	20	.1 opposite

Sn 90
Fe 10

Bi

10	90	3.9
20	80	1.8
30	70	.8
40	60	.2
50	50	.2

Sn 80
Fe 20

Fine

10	90	0
10	80	.1 opposite
30	70	.1 "
40	60	0
50	50	.1 "

Sn 70
Fe 30

Fine

10	90	0
20	80	0
25	75	.1 opposite
30	70	.1 "

Sn 60 Fe 40	Zinc	
10	90	1 Opaque
20	80	1 "
25	75	0

Silicium 5 Sb 95 – 3.9
? 10 " 90 – 4
~~Silicium~~ 15 " 85 – 3.8
20 " 80 – 3.5
25 " 75 – 4
35 " 45 – 1
60 " 40 – 0
70 " 30 – 0
65 " 35 – 0
75 " 25 – 0
80 " 20 – 0
85 " 15 – 0
90 " 10 – 0
95 " 5 – 0

Selenium 5	Arsenic 95	
10	90	
15	85	
20	80	
25	75	
30	70	3.1
35	65	3.1
40	60	2.7
45	55	.4 opp
50	50	0
55	45	
60	40	
65	35	
70	30	
75	25	
80	20	
85	15	
90	10	
95	5	

Bismuth	Selenium	
5	95	.3 off
10	90	.0.
15	85	.5 off
20	80	.2 off
25	75	6.3 off
30	70	9.5 off
35	65	2.4 off
40	60	6.0 Rx
45	55	7.9 off
50	50	3.9 off
55	45	9.8 off

Alloy Cad	Tellurium			
99	1	55	Sb 45	.2 opp
Cd 98	Tel 2	55	" 45	2.3 Right
97	3	"	"	1.8 "
96	4	"	"	.2 opp
95	4	"	"	0
94	6	"	"	.2 opp
93	7			2.4 Right
92	8	"	"	2.8 "
91	9			4.0 "
90	10	"	"	.1 "
89	11	"	"	1.5 opp
88	12	"	"	1.5 Right
87	13	"	"	4.3 "
86	14	"	"	.1 "
85	15			.2 opp
84	16			2.5 Right

Alloy				
Cadmium	Tellurium	55	Antimony	
84	16		45	2.5 Right
83	17	"	"	2.0 opp
82	18	"	"	0
81	19	"	"	1.8 opp
80	20	"	"	0

alloy

Cd	Bi	55 Sb 45	1.2 Right
99	1		
98	2	"	.8 "
97	3	"	1.2 "
96	4	"	.4 "
95	5	"	1.0 "
94	6	"	2. "
93	7		.6 "
92	8		1.0 "
91	9		1.0 "
90	10		1.0 "
89	11		3.5 "
88	12		3.4 "
87	13		3.8 "
86	14		3.0 "
85	15		4.2 "
84	16		3.4 "

Cd	Bi					
83	17	55	anting	45	4.0	Rigdt
82	18	"	"	"	611	"
81	19	"	"	"	518	"
80	20	"	"	"	319	"

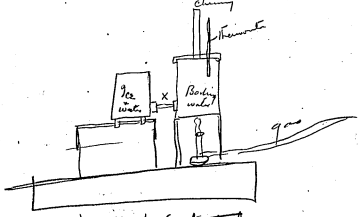
Notebook, N-01-04-19

This notebook is a continuation of N-01-04-16. The only dated entries are from April 1901. It contains notes by Edison and an unidentified experimenter regarding tests of various alloys for use in thermocouples. The metals tested include antimony, bismuth, lead, nickel, tin, and zinc. At the beginning of the book is a drawing by Edison illustrating the apparatus used in the experiments. The front cover is labeled "Thermo Battery Alloys & Experiment." The pages are unnumbered. Approximately 100 pages have been used.

1901

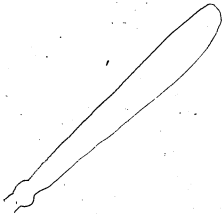
April 19 1901

Thermoelectric battery Experiments



x stick alloy to Gz tested.

			Voltage	Remarks
99	Sb	1 Zn	1/10 of 1 div	opposite
98		2	1/10 of 1 div	"
97		3	2/10 "	"
96		4	nothing	"
95		5	2/10 opp	"
94		6	1/10 div	opp
93		7	nothing	
92		8	nothing	
91		9	nothing	nothing
90		10	1/10 div opposite	1/10 div opposite



Apl 19 1901

2n	5b	
89	11	1/10 of deg
88	12	" " "
87	13	" " "
86	14	" " "
85	15	" " "
84	16	2/10 "
83	17	" "
82	18	3/10 "
81	19	3/10 "
80	20	3/10 "
79	21	" "
78	22	4/10 "
77	23	" of deg
76	24	1/2 "
75	25	1/2 "
74	26	1/2 "
73	27	1/2 "
72	28	1/2 "
71	29	7/10 "
70	30	1/2 "
69	31	6/10 "
68	32	1/2 "
67	33	1/2 "
66	34	7/10 "

Zn	Sb		
65	35	1/2 deg	
64	36	1/2 "	
63	37	"	
62	38	"	
61	39	1 deg	not filed- filed 8/10 deg
60	40	8/10 deg	
59	41	8/10 "	
58	42	8/10 "	
57	43	8/10 "	
56	44	8/10 "	
55	45	1 deg	
54	46	1 "	
53	47	1.3 deg	not filed- 1 deg filed -
52	48	1.5 "	
51	49	1.9 "	
50	50	1.5 "	
49	51	2.5 "	
48	52	3.1 "	
47	53	4.1 "	
46	54	2.2 55	S —
45	55	2.2	
44	56	6.2	Very brittle -
43	57	9.5	So brittle all broke piece 1/4 long and
42	58	5.8	not so brittle'
41	59	6.8	steel less
40	60	6.3	abt same
39	61	6.1	Brittle -
38	62	5.7	"

Zn - Sb

37	63	7.5 dip	- bad alloy
36	64	12.8"	Little Griffe
35	65	10.5"	
34	66	9.5"	
33	67	10.2	Little Griffe
32	68	9.6	
31	69	8	
30	70	7	
29	71	5.3	
28	72	6.9	
27	73	6	
26	74	1.8	S
25	75	6.2	
24	76	6.5	
23	77	4.2	S
22	78	11.	S
21	79	5.8	
20	80	4.9	
19	81	4.8	
18	82	4.5	
17	83	5.	
16	84	3.9	
15	85	3.2	
14	86	3.9	
13	87	4.5	
12	88	2.9	
11	89	4.	
10	90	3.5	
9	91	3.5	

8	92	215
7	93	3.
6	94	1.9
5	95	218
4	96	211
3	97	
2	98	
1	99	

End thru cooling

10Sb	90Pb	nil
20	80	
30	70	1/10 deg
40	60	3/10 "
50	50	1/2 "
60	40	1/2 "
70	30	3/10 "
80	20	1/2 "
90	10	8/10 "

Sb	Sn		
90	10	1 deg	
80	20	7/10 "	
70	30	5/10 "	
60	40	3/10 "	
50	50	2/10 "	
40	60	2/10 "	
30	70	1/10 "	
20	80	Nil —	
10	90	1/10 opp	

Sb	Cd		
90	10	4 deg	
80	20	5.9 "	
70	30	8.8 "	bottle of grease
60	40	12.2 "	"
50	50	3.5	
40	60	1/2 deg	
30	70	9/10 "	
20	80	1/2 "	
10	90	3/10	

Sb 60 Ao 40	1/10 dia	
Sb 90 amorphous 10	3 2/10 "	
Sb 95 " 5	3.5 "	
Sb 90 Cu 10	2. "	
Sb 80 Cu. 20	1 2/10 "	
Sb 70 Cu 30	8/10 "	
Sb 60 Cu 40	3/10 "	
Sb 50 Cu 50	1/10	
Sb 40 Cu 60	8/10	
Sb 30 Cu 70	2/10	
Sb 20 Cu 80	1/10	
Sb 90 Sodium 10	3/10	
Sb 80 " 20	1 3/10	not brittle
Sb 70 " 30	Nothing	Brittle

Sb 50 Sodium 50	1 deg	
Sb 40 " 60	nil.	
Sb 10 " 90	various	pleasantly nice
Sb 90 Sulphur 10	2 2/10	gradually goes lighter
Sb 80 " 20	nil	
Sb 70 " 30	nil	
Sb 60 " 40	nil	
Sb 40 " 60	3 2/10	
Sb 30 " 70	nil	
Sb 20 " 80	nil	
Sb 10 " 90	nil	
Sb 95 alum 5	3/10	
Sb 90 " 10	5/10 deg	
Sb 85 " 15	2 5/10	
Sb 80 " 20	2 8/10	
Sb 75 " 25	3/10	

Stannous Sulfide.	nil
Barium Manganate	nil
Magnesium Sulphide	nil
Proto Sulphide. Lead	1 deg opposite
Cobalt Sulphide	1 3/10 "
Tungsten Phosphide. W_4P_2	nil
Bismuth Sulphide	6 2/10 opposite good metal
Sodium Tungsten Bronze	1/10 made bad ng under over
Sb Sulfide Sb_2S_2	nil
Potassium Tungsten Bronze	nil made bad —
Cadmium Sulphide - by fusing Cd with Sulfur badly made high Res	2/10 make it good something wrong with chunk
Manganous Sulfide powder used cup —	nil.

Sulphide Mercury powder used Cup	1 deg Off
Tungsten Sulfide S_2 Powder – used Cup –	2 deg rightway
Hemisulfide. Iron powder	nil
Nickel Sulfide – fused	1 deg Off –
Copper Sulfide as a powder only 10/000 thick wetted end of cup – stick on –	10 deg Reg direction
Vanadium Dioxide V_2O_2 black powder used cup	1.5 deg Off
Vanadium Trioxide V_2O_3	1/10 deg off

Sb 95 Sb_2S_2 5	3.2 deg
Sb 90 " 10	3.5 "
Sb 85 " 15	3.5 "
Sb 80 " 20	3.6 "
Sb 75 " 25	3.8 "
Sb 70 " 30	3.7 "
Sb 65 " 35	3.7
Sb 60 " 40	3.7
Sb 55 " 45	3.3
Sb 50 " 50	3.6
Sb 45 " 55	3.5
" 40 " 60	3.8
" 35 " 65	3.6
Sb 95 PbS 5	1.5
Sb 90 " 10	1.4
Sb 85 " 15	.8
Sb 80 " 20	.5
Sb 75 " 25	.6
Sb 70 " 30	.5
Sb 65 " 35	.4
Sb 60 " 40	.5
Sb 55 " 45	.5

Sb 50 PbS 50	.4	
Sb95 CuS 5	2.9	
Sb90 " 10	2.9	
Sb 85 " 15	2.7	
Sb80 " 20	2.9	
Sb 75 " 25	3.	
Sb 70 " 30	3.	
Sb 95 SnS 5	1.9	
Sb 90 " 10	.8	
Sb 85 " 15	1.9	
Sb 80 " 20	1.3	
Sb 75 " 25	1.1	
Sb 70 " 30	2.9	

Sb 95	Cobalt sulfide	5	3.4
Sb 90	"	10	3.
Sb 85	"	15	2.9
Sb 95	CdS	5	2.9
Sb 90	"	10	3.8
Sb 85	"	15	4
Sb 80	"	20	4.9
Sb 75	"	25	4.9
Sb 70	"	30	6.5
Sb 95	Ni S	5	3.
Sb 90	"	10	3.
Sb 85	"	15	2.9

Sb 95 Bi 5	2.5
Sb 90 Bi 10	2.4
Sb 85 Bi 15	2.1
Sb 80 " 20	2.2
Sb 75 " 25	2.
Sb 70 " 30	1.4
Sb 65 " 35	1.
Sb 60 " 40	1.
Sb 55 " 45	.2 opp
Sb 50 " 50	1.6 opp
Sb 45 " 55	1.9 op
Sb 40 " 60	2.9 op
Sb 35 " 65	3.9 op
Sb 30 " 70	4.5 op
Sb 25 " 75	5.2 op
Sb 20 " 80	4. op
Sb 15 " 85	7.1 op
Sb 10 " 90	7.3 op
Sb 5 " 95	6.3 op
~~Sb 90 Bi 10~~	~~3.8~~
~~Sb 85 " 15~~	~~3.7~~
Zn 90 Sn 10	.1
" 85 " 15	.1
" 80 " 20	0
" 75 " 25	0

Zn 75	Sn 25	0
" 70	" 30	0
" 65	" 35	0
" 60	" 40	0
" 55	" 45	0
" 50	" 50	0
" 45	55	0
40	60	0
35	65	0
" 30	" 70	0
25	75	.1 opp
20	80	.1 op
15	85	.1 op
10	90	.1 op
5	95	.1 op

Sb 95	Hg2 S 5	3.5
Sb 90	" 10	3.3
" 85	" 15	3.1
" 80	" 20	3
" 75	" 25	3
70	" 30	2.9
65	35	2.9
60	40	2.9
55	45	2.5
50	50	0
45	55	0
40	60	0
35	65	2.5
30	70	0

Sb 95	5	3.	KYYo.
" 90	" 10	3	
85	" 15	3	
80	" 20	2.9	
75	25	0	
Sb 95 NaNb	5	2.5	
" 90	" 10	2.8	
" 85	15	2.3	
80	20	2.5	
75	25	2.2	
70	30	2	
65	35	2.5	
60	40	1.9	
Sb 95 (Zn 95 Sn 5)	5	2.9	
" 90	" 10	3.7	
85	" 15	3.9	
80	" 20	4.2	
75	" 25	6.	
70	" 30	8.5	
65	" 35	8.	
60	" 40	10.	
55	45	6.9	

Sb 50 (Zn 95 Sn 5)	50	6.9
" 45 "	55	2.5
40 "	60	1.8
35 "	65	1.1
30 "	70	.9
25 "	75	.9
20	80	.5
15	85	.4
10	90	0
5	95	0

Zn 50 Sn 50) 5	Sb 95	1.9
" 10	90	1.8
" 15	85	1.8
20	80	1.8
25	75	1.8
30	70	2.
35	65	2.
40	60	2.
45	55	1.2
50	50	2.
55	45	2.
60	40	1.9
65	35	.8
70	30	.5
75	25	.2
80	20	0
85	15	0
90	10	0
95	5	0

Alloy Zn 65 Sn 35

5 — 95	1.9
10 — 90	2.
15 — 85	2.
20 — 80	2.1
25 — 75	2.3
30 — 70	2.3
35 — 65	2.5
40 — 60	2.9
45 — 55	2.1
50 — 50	1.9
55 — 45	1.4
60 — 40	1.
65 — 35	.8
70 — 30	.6
75 — 25	.4
80 — 20	.1
85 — 15	.1
90 — 10	0.
95 — 5	0.

Alloy Zn 80
Sn 20

5	Sb 95	1.9
10	90	2.4
15	85	2.5
20	80	2.4
25	75	3.
30	70	4.
35	65	3.3
40	60	5.
45	55	8.2
50	50	4.5
55	45	3.
60	40	1.2
65	35	1.
70	30	1.
75	25	.8
80	20	.2
85	15	.1
90	10	0.
95	5	0.

Alloy

Zn 70 Sn 30	Sb	
5	95	2.
10	90	2.2
15	85	2.5
20	80	3.
25	75	3.3
30	70	3.7
35	65	4.4
40	60	4.1
45	55	4.9
50	50	3.8
55	45	2.2
60	40	1.5
65	35	1.5
70	30	.8
75	25	.4
80	20	.3
85	15	.2
90	10	0.
95	5	0

Alloy
Zn 75
Sn 25

	Sb	②
5	95	
10	90	1.9
15	85	2.8
20	80	2.9
25	75	3.2
30	70	3.9
35	65	3.8
40	60	5.
45	55	4.8
50	50	1.8
55	45	1.2
60	40	1.9
65	35	1.1
70	30	.5
75	25	.3
80	20	.2
85	15	.1
90	10	.1
95	5	0.

Alloy
Zn 5m
85 15

5 ~ Sb	95	2.3
10	90	2.8
15	85	3.1
20	80	3.6
25	75	4.1
30	70	5.
35	65	6.7
40	60	6.8
45	55	4.5
50	50	1.9
55	45	1.5
60	40	1.
65	35	1.
70	30	.5
75	25	.2
80	20	.1
85	15	.1
90	10	0.
95	5	0.

Alloy
Zn 90
Sn 10

5	Sb 95	2.3
10	90	2.7
15	85	3.4
20	80	4.2
25	75	5.3
30	70	5.9
35	65	7.8
40	60	6.9
45	55	3.
50	50	4.
55	45	1.9
60	40	.2
65	35	.2
70	30	.1
75	25	.1
80	20	.2
85	15	0.
90	10	.1
95	5	.1

Zn 25 Sn 75	5	Sb 95	1
	10	90	1.3
	15	85	1.2
	20	80	1.3
	25	75	1.3
	30	70	1.
	35	65	1.
	40	60	1.
	45	55	1.5
	50	50	1.1
	55	45	1.
	60	40	.9
	65	35	.5
	70	30	.2
	75	25	.1
	80	20	.2
	85	15	0.
	90	10	0.
	95	5	0.

Alloy

Zn 30
Sn 70

5	Sb 95	1.4
10	90	1.4
15	85	1.3
20	80	1.3
25	75	1.2
30	70	1.1
35	65	1.
40	60	1.2
45	55	1.1
50	50	.9
55	45	1.2
60	40	.8
65	35	.5
70	30	.9
75	25	.1
80	20	.1
85	15	.1
90	10	0.
95	5	0.

Alloy

Zn 40 Sn 60		
5	95	1.5
10	90	1.5
15	85	1.5
20	80	1.5
25	75	1.5
30	70	1.5
35	65	1.5
40	60	1.5
45	55	1.6
50	50	1.2
55	45	1.5
60	40	1.2
65	35	.8
70	30	1.5
75	25	.1
80	20	.1
85	15	0
90	10	0
95	5	.1 offscale

Alloy
Zn 45
Sn 55

5	Sb 95	1.4
10	90	1.8
15	85	1.5
20	80	1.7
25	75	1.7
30	70	1.8
35	65	1.5
40	60	
45	55	1.8
50	50	1.8
55	45	1.2
60	40	.7
65	35	1.1
70	30	.3
75	25	.2
80	20	.2
85	15	.2
90	10	.1
95	5	0.

Alloy
Zn 55
Sn 45

5	Sb 95	1.5
10	90	1.6
15	85	1.8
20	80	1.9
25	75	1.8
30	70	1.8
35	65	1.9
40	60	1.9
45	55	1.8
50	50	1.7
55	45	1.2
60	40	1.1
65	35	.8
70	30	.6
75	25	.5
80	20	.2
85	15	.1
90	10	0.
95	5	0.

Alloy
Zn 60
Sb 40

5	95	1.7
10	90	1.9
15	85	1.8
20	80	2.
25	75	2.
30	70	2.1
35	65	2.2
40	60	1.7
45	55	6.5
50	50	2.5
55	45	1.8
60	40	1.5
65	35	1.5
70	30	.8
75	25	.2
80	20	.1
85	15	0.
90	10	0.
95	5	0.

Alloy

Zn 35
Sn 65

5	95	1.1
10	90	1.
15	85	1.2
20	80	
25	75	1.2
30	70	1.1
35	65	1.1
40	60	1.
45	55	1.2
50	50	1.8
55	45	.8
60	40	.9
65	35	.7
70	30	.4
75	25	.1
80	20	.1
85	15	0.
90	10	0.
95	5	0.

Zn 15	5	95	.9
Sn 85	10	90	1.1
	15	85	1.
	20	80	1.
	25	75	.9
	30	70	.8
	35	65	.8
	40	60	.8
	45	55	.9
	50	50	.9
	55	45	.7
	60	40	.8
	65	35	.6
	70	30	.7
	75	25	.4
	80	20	.3
	85	15	.1
	90	10	.0
	95	5	.1 opp

Zn 20 Sn 80	5	Sb 95	.9
	10	90	1.1
	15	85	1.3
	20	80	1.2
	25	75	1.
	30	70	1.
	35	65	1.
	40	60	1.
	45	55	1.
	50	50	1.
	55	45	1.
	60	40	.9
	65	35	.8
	70	30	.2
	75	25	.2
	80	20	.1
	85	15	0.
	90	10	0.
	95	5	

1/10 opposite

Zn 10 Sn 90	5	Sb. 95	.9	
	10	90	1.2	
	15	85	1.	
	20	80	.9	
	25	75	.9	
	30	70	.8	
	35	65	.8	
	40	60	.8	
	45	55	.9	
	50	50	.9	
	55	45	.5	
	60	40	.5	
	65	35	.2	
	70	30	.1	
	75	25	0.	
	80	20	.1	Spraidi
	85	15	.1	"
	90	10	.1	"
	95	5	.1	"

2n 5	5	56 95	.9
5n 95			
	10	90	1.1
	15	85	1.1
	20	80	.9
	25	75	.8
	30	70	.8
	35	65	.5
	40	60	.5
	45	55	.6
	50	50	.6
	55	45	.5
	60	40	.4
	65	35	.2
	70	30	.2
	75	25	.1
	80	20	.1 opposite
	85	15	.1 "
	90	10	.1 "
	95	5	.1 "

Zn 5 Bismuth 95	5	Sb 95	3.2	
	10	90	3.8	
	15	85	3.8	
	20	80	3.5	
	25	75	3.8	
	30	70	3.4	
	35	65	3.1	
	40	60	1.7	
	45	55	.5	
	50	50	2.	
	55	45	.1	opposite
	60	40	.2	
	65	35	1 degree	opposite
	70	30	3.9	opposite
	75	25	3.4	"
	80	20	4.1	"
	85	15	5.8	"
	90	10	7.9	"
	95	5	4.9	"

Hard Magnetite One deg opposite —
Stibnite Sbs native O —
Brookite — .1 deg — neg
Galena 1.4 to 1.5 Opp Bi.S.Ds
fluctuation —
Molybdenite O —
Tourmaline O
Wecannite .. O — magnetic due to water on jar
Rutile O

90 Lead
10 Iron
Bearing alloy

Alloy. Lead 90 Iron 10	1.0	Dont alloy.
Lead 80 Iron 20	.9	dont alloy
Lead 70 Iron 30	.5	dont alloy
Lead 60 Iron 40	.5	opposite, dont alloy
Lead 50 Iron 50	.6	opposite, dont alloy.
Tin 90 Nickel 10	.3	opposite
Tin 80 Nickel 20	.5	opposite
Tin 70 Nickel 30	1	opposite
Tin 60 Nickel 40	1.5	opposite
Tin 50 Nickel 50	2.2	opposite
Zinc 90 Nickel 10	1.7	opposite
Zinc 80 Nickel 20	1.4	opposite
Zinc 70 Nickel 30	1	opposite

alloy Zinc .60 Nickel .40	1	opposite
Zinc .50 Nickel .50	2.1	opposite
Zinc .80 Nickel .20 Duplicate	1.6	opposite (not found in trials)
Antimony .90 Nickel .10	1.5	
Antimony .80 Nickel .20	1...	
Antimony .70 Nickel .30	.5	opposite
Antimony .60 Nickel .40	.6	opposite
Antimony .50 Nickel .50	.3	opposite
Zinc .90 Cu .10	.1	
Zinc .80 Cu .20	0	
Zinc .70 Cu .30	.2	
Zinc .60 Cu .40	.5	opposite
Zinc .50 Cu .50	.1	opposite

Phenomenon

* When a piece is held by tweezers between the Cold + Hot Cups but not touching a steam like vapor rises from the Cold Cup —
Other alloys dont do it except one tried back about 6 to 10 numbers — This should be investigated

Alloy		
Sb 90 Iron 10	1	
Sb 80 Iron 20	1	
Sb 70 Iron 30	.5	
Sb 60 Iron 40	.2	opposite
Sb 50 Iron 50	.6	opposite
Sn 90 Iron 10	.1	opposite
Sn 80 Iron 20	.2	opposite
Sn 70 Iron 30	.1	opposite
Sn 60 Iron 40 *	.2	opposite (Gives vapor off on cold side
Sn 50 Iron 50	.2	opposite (Doesn't give vapor.

alloy
Zn 90
Bismuth 10

5	95	3.2
10	90	3.7
15	85	4.2
20	80	4.5
25	75	5.4
30	70	6.9
35	65	13.9
40	60	12.8
45	55	[illegible]
50	50	3.9
55	45	3.1
60	40	2.5
65	35	1.4
70	30	1.2
75	25	.9
80	20	1
85	15	.7
90	10	.5
95	5	0

Alloy

Zinc 85
Bismuth 15

5 Sb	95	3.4
10	90	3.9
15	85	4.1
20	80	5.6
25	75	6.8
30	70	8.8
35	65	15.3
40	60	14.9
45	55	8.5
50	50	8.
55	45	3.4
60	40	3.4
65	35	1.5
70	30	1.5
75	25	1.3
80	20	1.1
85	15	.1
90	10	.1
95	5	0

Alloy
Zinc 80
Bismuth 20

5	95	3.1
10	90	3.9
15	85	4.3
20	80	4.7
25	75	5.3
30	70	6.
35	65	8.9
40	60	10.8
45	55	8.8
50	50	5.5
55	45	3.4
60	40	2.9
65	35	1.8
70	30	1.5
75	25	1.5
80	20	1.4
85	15	.3
90	10	.2
95	5	0

Alloy
Zinc 20
Bismuth 80

Sn	Sb	g	
10	90	2.6	
15	85	2.8	
20	80	2.7	
25	75	2.8	
30	70	2.5	
35	65	2.5	
40	60	2.4	
45	55	2.8	
50	50	1.4	
55	45	1.6	
60	40	1.4	
65	35	.3	
70	30	.4	opposite
75	25	2	"
80	20	1.4	"
85	15	3	"
90	10	2.8	"
95	5		

Alloy
Zinc 90
Bismuth 5

5	95	3.4
10	90	4.3
15	85	4.8
20	80	5.3
25	75	6.
30	70	17.9
35	65	13.1
40	60	14.9
45	55	10.4
50	50	4.7
55	45	2.6
60	40	1.8
65	35	1
70	30	.4
75	25	.8
80	20	.5
85	15	.3
90	10	.1
95	5	0.

Alloy

Zinc 10

Bismuth 90

5 Sb	95	2.9	
10	90	2.8	
15	85	1.7	
20	80	2.5	
25	75	2.3	
30	70	2.4	
35	65	2.5	
40	60	2.1	
45	55	1.7	
50	50	1.5	
55	45	2.	
60	40	1.7	
65	35	1.5	approach
70	30	2	"
75	25	4	"
80	20	3.5	"
85	15	5.9	"
90	10	6	"
95	5	4.4	"

Alloy

Zinc 15
Bismuth 85

5 Sb	95		
		2.8	
10	90	2.8	
15	85	2.8	
20	80	2.8	
25	75	2.8	
30	70	2.3	
35	65	2.4	
40	60	2.3	
45	55	2.2	
50	50	1.9	
55	45	1	
60	40	.5	
65	35	.2	opposite
70	30	1.4	"
75	25	2.5	"
80	20	3.0	"
85	15	3.3	"
90	10	2.8	"
95	5	2.2	"

Alloy

Zinc 60
Bismuth 40

5 Sb	95	3.1
10	90	3.5
15	85	3.3
20	80	4.1
25	75	4.2
30	70	5.4
35	65	5.8
40	60	7.8
45	55	9.9
50	50	4.5
55	45	10.3
60	40	8.
65	35	2.8
70	30	2.
75	25	1.8
80	20	.8
85	15	0
90	10	.2
95	5	0

Alloy

Zinc 60
Bismuth 35

5 Sb	95	3
10	90	3.8
15	85	3.8
20	80	4.
25	75	4.3
30	70	5.3
35	65	5.8
40	60	8.3
45	55	11.6
50	50	10.
55	45	7.8
60	40	3.3
65	35	2.5
70	30	2.8
75	25	2.8
80	20	2.
85	15	2
90	10	.2
95	5	0

Alloy
Zinc 70 }
Bismuth 30 }

5 Sb	95	3.2	
10	90	2.9	
15	85	3.9	
20	80	4.2	
25	75	4.5	
30	70	6.1	
35	65	8.	
40	60	8.8	
45	55	10.3	
50	50	7.5	
55	45	6.4	
60	40	3.3	
65	35	2.2	
70	30	2.5	
75	25	1.1	
80	20	1.8	
85	15	.5	
90	10	.2	
95	5	.2	opposite.

Alloy
Zinc 75
Bismuth 25

5	95	2.5
10	90	3.2
15	85	3.5
20	80	3.9
25	75	4.
30	70	5.
35	65	6.
40	60	9.9
45	55	12.8
50	50	10.9
55	45	3.6
60	40	3.
65	35	1.6
70	30	[illegible]
75	25	2.4
80	20	1.5
85	15	.5
90	10	1.2
95	5	.1

Pb 90
As 10 — .1 opposite

.13 g. of as in 15 g Sb — 0

Tried Pb. second time and put 5.1 gr of Co as in 15 gr. of Pb

5 gr. of Co As in 15 gr. Pb. — .1 opposite

5 g. as in 15 g. of Sn — .5

1.8 gr Co As in 15 g Sn — 1.9

Put 4 g. of As in 83 g of Pb. — 0

1.2 g of as in 15 g of zinc — mold not cake

9.8 of As in 15 g of Co — mold not cake

Alloy
Tin 75
Bismuth 25

5 Sb	95	1.1	
10	90	1.3	
15	85	1.1	
20	80	.9	
25	75	.8	
30	70	.8	
35	65	.7	
40	60	.8	
45	55	.8	
50	50	.8	
55	45	.7	
60	40	.6	
65	35	.5	
70	30	.3	
75	25	.2	
80	20	.1	
85	15	.1	
90	10	.1 opposite	
95	5	.1 "	

Alloy

Tin 80
Bismuth 20

5 SB	95	.9
10	90	1.1
15	85	1.
20	80	.9
25	75	.9
30	70	.9
35	65	.8
40	60	.6
45	55	.7
50	50	.6
55	45	.6
60	40	.5
65	35	.5
70	30	.4
75	25	.5
80	20	.1
85	15	0
90	10	0
95	5	0

Alloy

Tin 85
Bismuth 15

5 Sb 95	1
10	1.1
15	1
20	.9
25	.9
30	.8
35	.8
40	.6
45	.6
50	.5
55	.5
60	.3
65	.2
70	.1
75	.1
80	0
85	0
90	0
95	

Alloy

Tin 90
Bismuth 10

5	Sb 95	.9
10	90	1
15	85	1
20	80	.9
25	75	.9
30	70	.8
35	65	.8
40	60	.7
45	55	.5
50	50	.5
55	45	.4
60	40	.3
65	35	.2
70	30	.1
75	25	.1
80	20	.1
85	15	0
90	10	0
95	5	.1

Upward

Alloy

Tin 70
Bismuth 30

5	95	1
10	90	1.2
15	85	1.2
20	80	1
25	75	.9
30	70	.9
35	65	.8
40	60	.7
45	55	.8
50	50	.8
55	45	.8
60	40	.6
65	35	.5
70	30	.5
75	25	.4
80	20	.2
85	15	.1
90	10	0
95	5	0

Alloy

Zinc 45
Bismuth 55

5	Sb	95	3	
10		90	3	
15		85	3.2	
20		80	3.1	
25		75	3.4	
30		70	4.1	
35		65	3.9	
40		60	4.7	
45		55	7	
50		50	5.4	
55		45	6.2	
60		40	6	
65		35	3.5	
70		30	2.9	
75		25	1.5	
80		20	.5	
85		15	.5	opposite
90		10	0.1	opposite
95		5	1.4	opposite

Alloy
Zinc 30
Bismuth 70

5	95	2.6	
10	90	2.9	
15	85	2.9	
20	80	2.9	
25	75	3.	
30	70	3.	
35	65	3.4	
40	60	3.8	
45	55	4.1	
50	50	4.2	
55	45	4.5	
60	40	5.	
65	35	4.1	
70	30	3.6	
75	25	2.8	
80	20	2.9	
85	15	1.	opposite
90	10	1.2	"
95	5	1.9	opposite

Alloy

Zinc 35
Bismuth 65

5 Sb	95	2.9
10	90	3.2
15	85	3.4
20	80	3.4
25	75	3.5
30	70	4.
35	65	3.2
40	60	3.5
45	55	3.7
50	50	4.4
55	45	3.6
60	40	4.6
65	35	4.
70	30	3.2
75	25	1.
80	20	.6
85	15	.4 opposite
90	10	.5 "
95	5	2 opposite

Alloy

Zinc 50
Bismuth 50

5 Sb	95	2.8
10	90	2.9
15	85	3.3
20	80	3.6
25	75	3.8
30	70	4.
35	65	4.9
40	60	5.
45	55	6.
50	50	9.4
55	45	9.9
60	40	8.4
65	35	3.3
70	30	2.5
75	25	1.4
80	20	.7
85	15	.2
90	10	.3 opaque
95	5	1.4 "

Alloy

Zinc 40
Bismuth 60

5	95	3	
10	90	2.8	
15	85	3.3	
20	80	2.9	
25	75	3.2	
30	70	3.9	
35	65	3.8	
40	60	3.8	
45	55	3.9	
50	50	3.8	
55	45	4.8	
60	40	5.5	
65	35	5.3	
70	30	6.4	
75	25	1.8	
80	20	.5	
85	15	.1	opposite
90	10	.3	1
95	5	1	4

Alloy
Zinc 25
Bismuth 75

5	95	2.4	
10	90	3.	
15	85	2.7	
20	80	2.7	
25	75	2.9	
30	70	2.9	
35	65	3.3	
40	60	3.2	
45	55	3.	
50	50	3.1	
55	45	3.1	
60	40	2.1	
65	35	3.4	
70	30	3.1	
75	25	2.6	
80	20	.4	opposite
85	15	1	"
90	10	1.3	"
95	5	2	"

Alloy

Zinc 55
Bismuth 45

5	Sb. 95	2.8	
10	90	3.1	
15	85	3.4	
20	80	3.7	
25	75	4.3	
30	70	4.5	
35	65	4.9	
40	60	5.8	
45	55	7.8	
50	50	11.2	
55	45	8.5	
60	40	5.6	
65	35	2.5	
70	30	2.9	
75	25	1.3	
80	20	1	
85	15	.1	
90	10	.2	opposite
95	5	1	"

Alloy

~~Zinc~~
Sn 5
Bismuth 95

5	Sb 95	1	
10	90	1.2	
15	85	1.1	
20	80	.9	
25	75	.6	
30	70	.6	
35	65	.5	
40	60	.4	
45	55	.4	
50	50	.3	
55	45	.3	
60	40	.3	
65	35	.2	
70	30	.2	
75	25	.1	
80	20	0	
85	15	0	
90	10	.1	opposite
95	5	.1	"

Tin 95
Bismuth 5

Alloy

Tin 30
Bismuth 70

5 — Sb		
95	1	
90	.9	
85	1.1	
80	1.3	
75	1.3	
70	1.3	
65	1.4	
60	1.2	
55	1.3	
50	1.4	
45	1.5	
40	1.5	
35	1.6	
30	1.9	
25	1.8	
20	1.8	
15	1.8	
10	1.7	
5	1.5	

Alloy

Sn 45

Bismuth 55

Sb		
5	95	.4
10	90	1.2
15	85	1.2
20	80	1.2
25	75	1.2
30	70	1.1
35	65	1.2
40	60	1.
45	55	1.
50	50	1.
55	45	1.1
60	40	1.1
65	35	1.1
70	30	1.2
75	25	1.
80	20	1.
85	15	1.
90	10	.9
95	5	.9

Alloy

Sn 65
Bismuth 35

	Sb	
5	95	1.1
10	90	1.
15	85	1.2
20	80	1.
25	75	1.
30	70	1.1
35	65	.9
40	60	.9
45	55	.8
50	50	.9
55	45	.9
60	40	.9
65	35	.8
70	30	.5
75	25	.5
80	20	.3
85	15	.1
90	10	0
95	5	0

Alloy
Sn 35
Bismuth 65

5	Sb. 95	.9
10	90	1.2
15	85	1.3
20	80	1.4
25	75	1.4
30	70	1.3
35	65	1.2
40	60	1.2
45	55	1.1
50	50	1.4
55	45	1.3
60	40	1.5
65	35	1.5
70	30	1.6
75	25	1.8
80	20	1.8
85	15	1.8
90	10	1.2
95	5	1.2

Alloy
Sn 50
Bismuth 50

5	95	1.2
10	90	1.
15	85	1.3
20	80	1.2
25	75	1.1
30	70	1.
35	65	1.
40	60	1.
45	55	1.
50	50	1.
55	45	1.
60	40	1.
65	35	1.1
70	30	1.
75	25	1.
80	20	.9
85	15	.8
90	10	.7
95	5	.3

Alloy
Sn 60
Bismuth 40

	Sb.	
5	95	1.
10	90	1.2
15	85	1.3
20	80	1.2
25	75	1.
30	70	1.
35	65	.9
40	60	.9
45	55	.9
50	50	1.
55	45	.9
60	40	.9
65	35	1.
70	30	.9
75	25	.5
80	20	.5
85	15	.3
90	10	0.
95	5	0.

Alloy
Sn 5-5
Bismuth 45

5	~~St.~~ 95	1.1
10	90	1.2
15	85	1.2
20	80	1.2
25	75	1.2
30	70	1.
35	65	1.
40	60	1.
45	55	1.
50	50	1.
55	45	1.
60	40	1.
65	35	1.
70	30	1.
75	25	.9
80	20	.8
85	15	.5
90	10	.4
95	5	0.

Alloy
Sec 48
Diamond 60

5	Sb.	95	1
10		90	1.4
15		85	1.3
20		80	1.2
25		75	1.1
30		70	1.1
35		65	1.1
40		60	1.
45		55	1.
50		50	1.
55		45	1.1
60		40	1.2
65		35	1.3
70		30	1.4
75		25	1.5
80		20	1.8
85		15	0.5
90		10	1.1
95		5	1.2

Alloy
Pb 5
Bi 95

5	Sn.	95	3
10		90	2.6
15		85	2.7
20		80	2.5
25		75	2.3
30		70	2.1
35		65	2.1
40		60	1.9
45		55	2.
50		50	1.8
55		45	1.4
60		40	1.3
65		35	1.5
70		30	.9
75		25	.5
80		20	.2
85		15	.1 offsets
90		10	1 offsets
95		5	1.5 "

alloy
Pb 10
Bi 90

5	2lb.	95	2.8
10		90	2.4
15		85	2.2
20		80	2.
25		75	2.1
30		70	2.1
35		65	2.
40		60	2.
45		55	2.
50		50	1.9
55		45	1.9
60		40	1.9
65		35	2.
70		30	1.9
75		25	1.2
80		20	2
85		15	1.9
90		10	2.
95		5	1.

Alloy Pt. 15 Bi. 85

5 Sb.	95	2.3
10	90	2.1
15	85	2.
20	80	1.9
25	75	1.9
30	70	2
35	65	1.9
40	60	2
45	55	2.
50	50	2.
55	45	2
60	40	1.9
65	35	2
70	30	1.9
75	25	2
80	20	2
85	15	1.8
90	10	2.
95	5	1.6

Alloy
B1-B2
Si 80

5	St.	95	2.5
10		90	2
15		85	1.9
20		80	1.9
25		75	1.9
30		70	2.
35		65	1.8
40		60	1.4
45		55	1.8
50		50	1.7
55		45	1.5
60		40	1.6
65		35	1.8
70		30	1.6
75		25	2
80		20	2.
85		15	2.
90		10	2.
95		5	1.9

Allo	.5	Sb	95	2.2
PL 25	10		90	2.1
Bi 75	15		85	2.
	20		80	1.7
	25		75	1.5
	30		70	1.5
	35		65	1.5
	40		60	1.4
	45		55	1.6
	50		50	1.7
	55		45	1.2
	60		40	1.4
	65		35	1.2
	70		30	1.5
	75		25	1.3
	80		20	1.5
	85		15	1.5
	90		10	2.
	95		5	2

Along
Surf 25
Bi 75

5	Sb	95	2
10		90	1.8
15		85	1.9
20		80	1.9
25		75	1.9
30		70	2
35		65	1.8
40		60	1.6
45		55	1.5
50		50	1.5
55		45	1.5
60		40	1.5
65		35	1.5
70		30	1.5
75		25	1.5
80		20	1.1
85		15	1.2
90		10	1.
95		5	1.

Alloy
Pb 30
Bi 70

5 Sb	95	2.1
10	90	2.
15	85	1.5
20	80	1.1
25	75	1.1
30	70	1.1
35	65	1.1
40	60	1.
45	55	1.
50	50	1.1
55	45	1.
60	40	1.
65	35	1.1
70	30	1.2
75	25	1.2
80	20	1.3
85	15	1.5
90	10	1.6
95	5	1.7

Alloy
Pb 35
Bi 65

0	50	95	1.9
10		90	1.6
15		85	1.2
20		80	1.1
25		75	1.
30		70	1.
35		65	.9
40		60	1.
45		55	.9
50		50	1.
55		45	1.
60		40	.9
65		35	1.
70		30	1.
75		25	1.
80		20	1.1
85		15	1.1
90		10	1.1
95		5	1.9

Alloy
Sn 5
Si 95

5	95	2.
10	90	1.9
15	85	1.5
20	80	1.
25	75	1.2
30	70	1.4
35	65	1.6
40	60	2.
45	55	2.1
50	50	2.6
55	45	2.9
60	40	3.
65	35	3.5
70	30	3.2
75	25	4.
80	20	4.3
85	15	4.1
90	10	4.5
95	5	4.9

Alloy
Sn 15
Bi 85

5	Sb	95	1.1
10		90	1.
15		85	1.4
20		80	1.
25		75	1.6
30		70	1.9
35		65	1.9
40		60	1.9
45		55	1.9
50		50	2.
55		45	2.
60		40	1.9
65		35	2.
70		30	2.1
75		25	2.1
80		20	2.5
85		15	2.5
90		10	2.8
95		5	2.2

Alloy

Sn 20

Bi 80

Sn	Sb		
5	95		1
10	90		1
15	85		1.1
20	80		1.3
25	75		1.6
30	70		1.5
35	65		1.7
40	60		1.9
45	55		1.9
50	50		1.9
55	45		1.9
60	40		2.
65	35		2.
70	30		2.
75	25		2.
80	20		2.1
85	15		2.1
90	10		2.1
95	5		2.6

Alloy
Sn 10
Bi 90

5	95	1.9
10	90	1.
15	85	1.1
20	80	1.1
25	75	1.5
30	70	1.6
35	65	1.8
40	60	2.
45	55	2.1
50	50	2.1
55	45	2.3
60	40	2.5
65	35	2.5
70	30	2.9
75	25	2.9
80	20	3.
85	15	3.
90	10	3.4
95	5	3.1

Alloy
Pb Sb
Bi 40

5 Sb	95	1.9
10	90	1.2
15	85	1.
20	80	.9
25	75	.9
30	70	.6
35	65	.5
40	60	.5
45	55	.5
50	50	.4
55	45	.4
60	40	.3
65	35	.5
70	30	.3
75	25	.2
80	20	.1
85	15	.1
90	10	.1
95	5	0.

Alloy Pb 40 Bi 60.

5	Sn.	95	2.
10		90	1.5
15		85	1.1
20		80	1.
25		75	1.
30		70	1.
35		65	.9
40		60	.9
45		55	.8
50		50	.9
55		45	.8
60		40	.9
65		35	.9
70		30	.9
75		25	.9
80		20	.9
85		15	1.
90		10	.9
95		5	.9

Alloy
Pb 45
Bi 55

5	95	2
10	90	1.8
15	85	1.2
20	80	1
25	75	1
30	70	1
35	65	.9
40	60	.8
45	55	.8
50	50	.8
55	45	.6
60	40	.7
65	35	.5
70	30	.7
75	25	.7
80	20	.7
85	25	.7
90	10	.4
95	5	.4

Alloy Pt 50 Si 50

5 Sb	95	1.9
10	90	1.8
15	85	1.5
20	80	1.
25	75	.8
30	70	.8
35	65	.7
40	60	.7
45	55	.6
50	50	.6
55	45	.6
60	40	.5
65	35	.5
70	30	.5
75	25	.5
80	20	.4
85	15	.4
90	10	.4
95	5	.2

Alloy	5 Sb	95	1.9
Pb 55	10	90	1.5
Bi 45	15	85	1.1
	20	80	.9
	25	75	.8
	30	70	.7
	35	65	.6
	40	60	.5
	45	55	.6
	50	50	.5
	55	45	.6
	60	40	.4
	65	35	.4
	70	30	.4
	75	25	.3
	80	20	.2
	85	15	.2
	90	10	.1
	95	5	0

Alloy
Co 95
Si 5

5	95	3.6
10	90	4.
15	85	4.5
20	80	4.1
25	75	4.8
30	70	6.2
35	65	7.9
40	60	
45	55	10.2
50	50	11.
55	45	17.3
60	40	11.3
65	35	9.9
70	30	16.8
75	25	.5
80	20	1.2
85	15	1.
90	10	.8
95	5	.4

Alloy	5 Sb	95	3.3
Cd 90	10	90	4.
Bi 10	15	85	4.4
	20	80	4.8
	25	75	5.7
	30	70	5.
	35	65	5.
	40	60	5.2
	45	55	6.
	50	50	7.9
	55	45	10
	60	40	4.5
	65	35	17.
	70	30	5.
	75	25	10.9
	80	20	.9
	85	15	1.2
	90	10	.7
	95	5	.5

Alloy Sb
Cd .85
Bi .15

5	95	3.8
10	90	4.2
15	85	4.
20	80	4.9
25	75	4.5
30	70	5.9
35	65	6.2
40	60	4.9
45	55	8.9
50	50	10.
55	45	10.9
60	40	8.9
65	35	4.8
70	30	.5
75	25	.5
80	20	1.
85	15	.7
90	10	.5
95	5	.2

Alby
Ad 8
Hi 20

5	95	3.5
10	90	4.
15	85	4.5
20	80	5.2
25	75	4.1
30	70	5.9
35	65	6.9
40	60	6.
45	55	6.2
50	50	7.
55	45	9.5
60	40	4.5
65	35	1.5
70	30	1.
75	25	.9
80	20	.5
85	15	.5
90	10	.9
95	5	.2

Alloy Sb

Cd 75

Bi 25

5	95	3.6
10	90	3.5
15	85	4.1
20	80	4.2
25	75	5.
30	70	5.9
35	65	6.2
40	60	6.8
45	55	7.5
50	50	9.3
55	45	9.2
60	40	10.9
65	35	2.9
70	30	1.6
75	25	1.2
80	20	1.8
85	15	.5
90	10	.3
95	5	.1

Alloy

Cd 60

Bi 40

5	95	3.2
10	90	3.8
15	85	4.
20	80	3.9
25	75	4.5
30	70	4.9
35	65	5.3
40	60	5.6
45	55	6.
50	50	7.
55	45	7.9
60	40	8.
65	35	3.
70	30	2.5
75	25	1.
80	20	.4
85	15	.2
90	10	.2
95	5	0

Alloy 5 Sb 95 3.2
Cd 5 Sb 10 90 3.6
Bi 45 15 85 3.9
20 80 3.9
25 75 4.3
30 70 4.4
35 65 4.9
40 60 5.3
45 55 5.5
50 50 6.2
55 45 6.3
60 40 6.9
65 35 6.
70 30 2.
75 25 2.5
80 20 1
85 15 .2
90 10 .1
95 5 0

Alloy Cd 50 Bi 50

5 Sh	95	3.2
10	90	3.5
15	85	3.2
20	80	3.8
25	75	4.
30	70	4.4
35	65	4.5
40	60	5
45	55	4.5
50	50	4.9
55	45	5.
60	40	5.2
65	35	4.8
70	30	2.4
75	25	.5
80	20	.5
85	15	0
90	10	1 opposite
95	5	.4

Alloy
Cd 40
Bi 55

5	95	3.2
10	90	3.4
15	85	3.7
20	80	3.5
25	75	4.
30	70	4.
35	65	4.1
40	60	4.
45	55	4.
50	50	4.2
55	45	4.2
60	40	3.8
65	35	3.9
70	30	3.
75	25	1.2
80	20	.2
85	15	.5
90	10	.1 [illegible]
95	5	.2 "

Alloy Cd 40 Bi 60

	Sb	
5	95	3.2
10	90	3.2
15	85	3.2
20	80	3.2
25	75	3.6
30	70	3.9
35	65	3.8
40	60	3.4
45	55	3.8
50	50	3.3
55	45	3.2
60	40	1.5
65	35	2.5
70	30	1.4
75	25	.2 opposite
80	20	.4 "
85	15	.3 "
90	10	.1 "
95	5	.6 "

allo

Alloy	5	95	3
Cd 36	10	90	3.2
Bi 65	15	85	3.2
	20	80	3.5
	25	75	3.8
	30	70	3.6
	35	65	3.7
	40	60	3.5
	45	55	3.1
	50	50	3.9
	55	45	3.9
	60	40	3
	65	35	4.1
	70	30	3.1
	75	25	1.9
	80	20	.2 opposite
	85	15	.1
	90	10	.3 opposite
	95	5	1 "

Alloy:	5	Sb. 95	3
Cd 30	10	90	3.1
Bi 70	15	85	3.
	20	80	3.1
	25	75	3.2
	30	70	3.3
	35	65	3.5
	40	60	3.6
	45	55	3.3
	50	50	3.1
	55	45	3.7
	60	40	8.8
	65	35	3.5
	70	30	3.8
	75	25	9.3
	80	20	1
	85	15	.5
	90	10	.2 opposite
	95	5	.8 "

Alloy	5	St	95	1.5
Pb 95	10		90	1
Bi 5	15		85	.9
	20		80	.8
	25		75	.8
	30		70	.7
	35		65	.6
	40		60	.6
	45		55	.6
	50		50	.6
	55		45	.5
	60		40	.4
	65		35	.3
	70		30	.2
	75		25	.1
	80		20	.1
	85		15	0
	90		10	0
	95		5	
				.1 Approx.

Notebook, N-01-04-20

The one dated entry in this notebook is from April 1901. All entries are by Edison. The book contains notes, drawings, and calculations pertaining to the design, construction, and layout of works for the manufacture of storage batteries. Included are a list of "articles wanted," drawings of chemical apparatus and other equipment, sketches of plant layout, and other notes regarding the character and the scale of operations. In a few cases equipment is identified for removal from the ore milling plant at Ogden, New Jersey, to the new storage battery facility. The pages are unnumbered, and the book has been used in both directions. Approximately 60 pages have been used.

100 persons 150 dollars — 5 battery. Cendor. 30 per

90 159

10 girls

Storage Battery April 20 1901

Factory processes

List of articles wanted.

1 Rolls for rolling .002 sheet.
2 " " " finishing
3 annealing oven for annealg sheet.
*5 Nickel plating dept.
6 perforating rolls
7 Forming presses for Cups
8 Presses for punching grid
9 — " " flattening "
10 press for punching hole in grid lug
11 Shears for cutting grid stock

12 – 2 Hydraulic presses + accumulators

13 – Several ~~Stationary~~ ~~Corrugating~~ Dies for setting Cups in grid –

14 =

15 = Ingot press

16 ~~Slide~~ Cake presses

17 – Auto assembling machine putting Cakes in Cups –

18 Auto assembling Cups in grid

19 Auto screw machine for forming between lugs on grid for nuts + connecting rod –

20 Hard rubber forming press for Corrugating Hot water device

21 Hard rubber punch + Die

22 ~~Punch~~ Presses for making battery Cell – soldering device –

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37 - press for cover of Gathering jar

38 - Kettle for Jar mixing for sealing jar

39 Screw mandrel for metal vent, non nickel plated

40

41 - Long wooden Louisville tanks for washing Nickel Hydroxide

42 = two large steam kettles for Boiling - making $Ni(OH)_2$ (smelting to recover the excess nickel)

43 - Kettle for dissolving NaOH + rough filtering liquid -

44 Crocks for making $NiSO_4$ from oxide

45 = Steam and bath for heating Crocks

46 = filter stands, wire screen trays etc for filtering $Ni(OH)_2$

47 – air chamber rack-agate pans – Steam coil + Exhaust fan for Drying NaH_2O_2

48 – small light Chillian mill for Crushing Na_2O $NaOH$ for chlorinating

49 – Chlorine Generator + Ventilator

50 Chlorinating tables, Hood etc with racks for tubes etc,

51 – percolating bench + water pipes for percolating

52 = Drying chamber for drying Na_2O_3 drip of Hose for $NaOH$

53 – Chillian Mill for grinding + screening blowing chamber for making Na_2O_3 finer than 200 mesh

54

55

56 · Some device for mixing Na Perox with graphite.

57 = possibly ~~Kettle~~ cleaning Kit for oxalate iron

58 – Jacks for washing oxalate

59 filtering rax "

60 Drying Chamber "

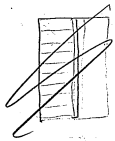
61 – Furnace for igniting "

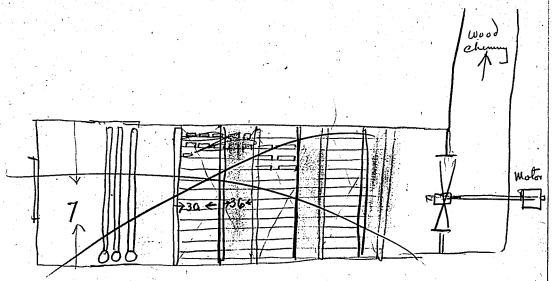
62 Device for mixing FeO with graphite

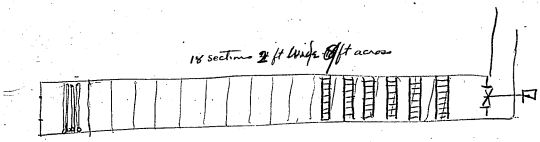
63 Ingot press for FeO

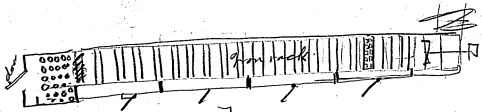
64 Cake-press "

65 filter press —
66
67
68
69 — office
70 - Test room —
71 Packing room
72 Store room for supplies + chemicals
73 — Driven well for water —
74
75
76
77
78
79
80

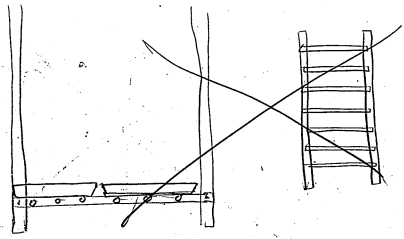


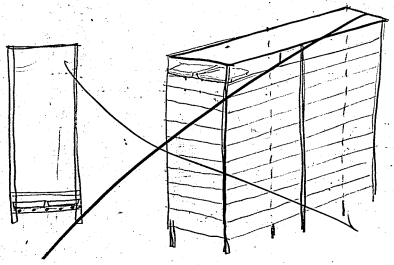

Wood chipper
Motor
7
30
36

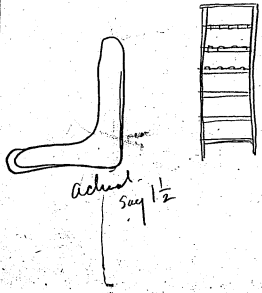




Top view




12
24
9
3



Just as cheap to make this of wood instead of iron figure cost roles up both ways

angle

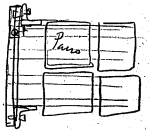
angle iron

small strands 3/4" apart

Wrought iron

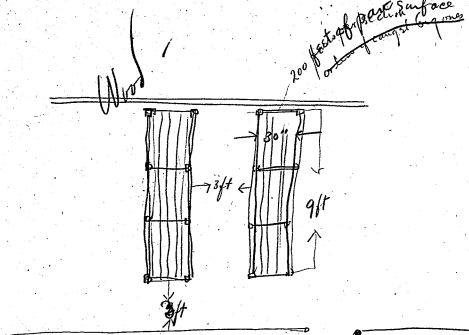
or 3/8 rod better probably best

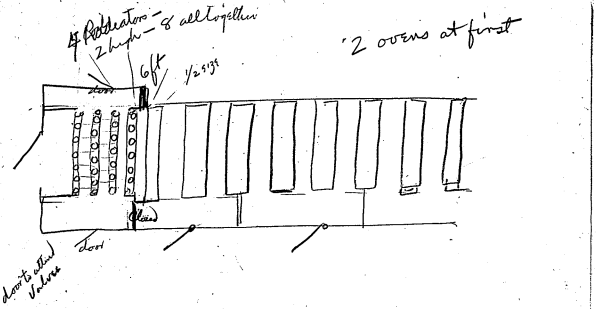
6" between

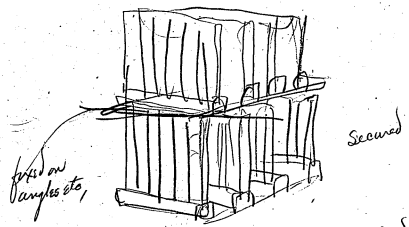


Before sizes are determined ascertain breakage against ware piano

38 16) 6000 (380
480
1240
1240





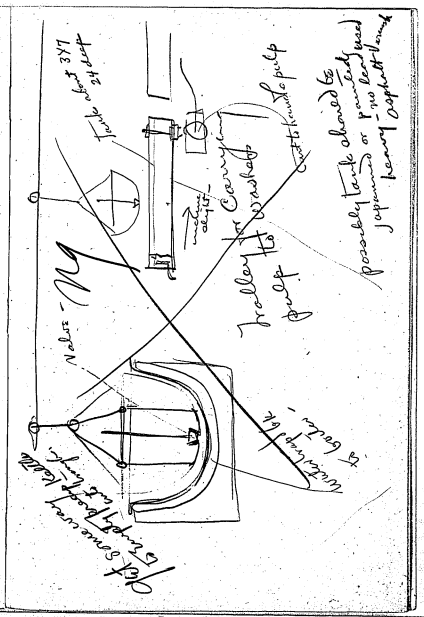


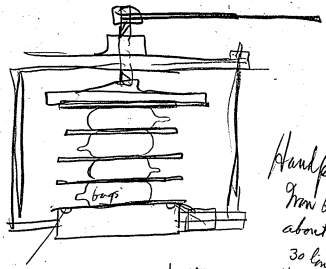
Water trapped backed to hot well
at boiler —

Investigate filter presses
+ see rate + kind of material
Can be worked —

How about Cotton filter press
Bags etc = Ascertain
who makes press — see
Widing of Cooper + Co
about filtering press —

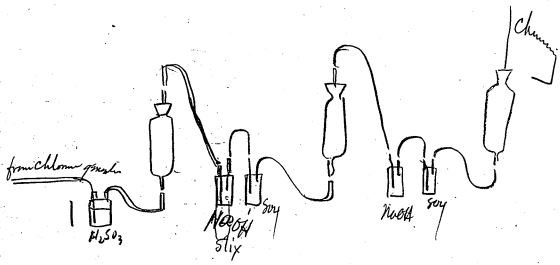
Find out about sizes
Steam kettles —

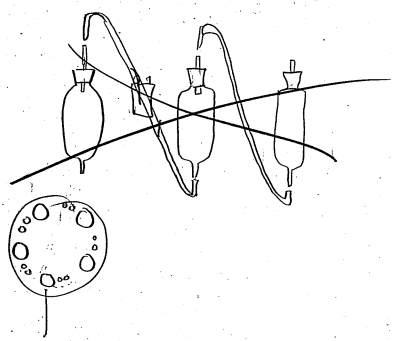




Hand press
Iron bags
about 18" dia
30 long or
thereabouts
Bags made out
following Canvass —

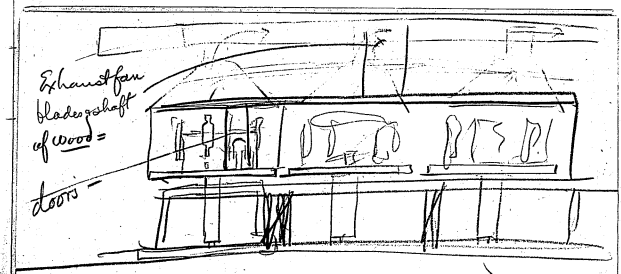
Look up Cider presses —


from chlorine generator
H_2SO_3
NaOH
stix
soy
NaOH
soy

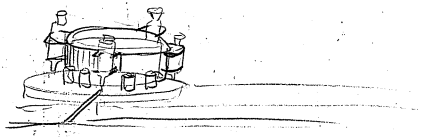


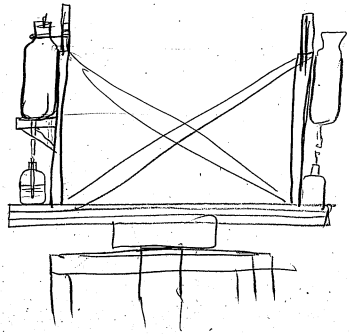
Allhouse - 10 lb cast
1 lb lb stamp
pendant

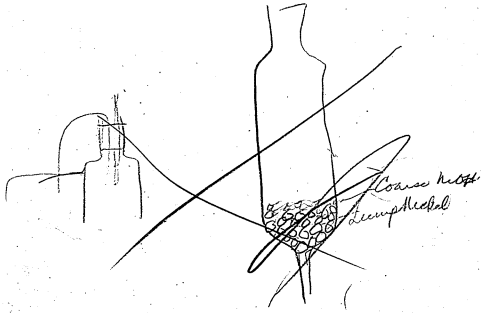
J. Allenbach -
December 15

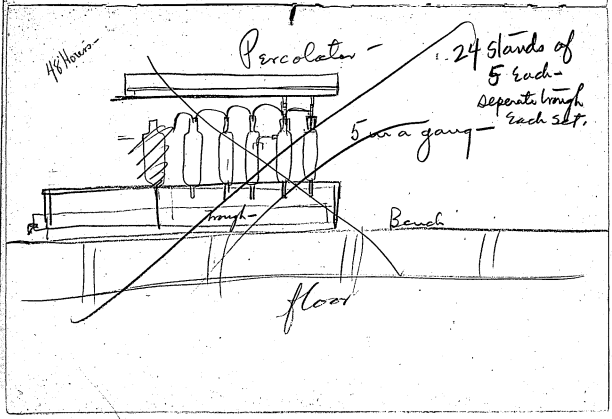


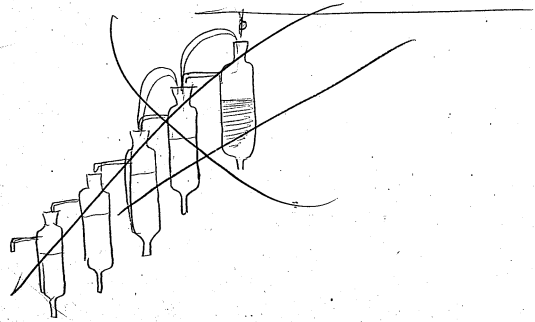
Rotate = Wood duck 3 ply | mahboard
sloped = wood post | non bottom center

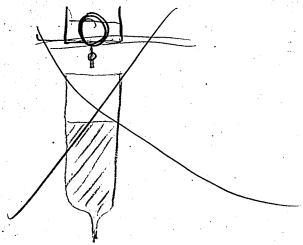


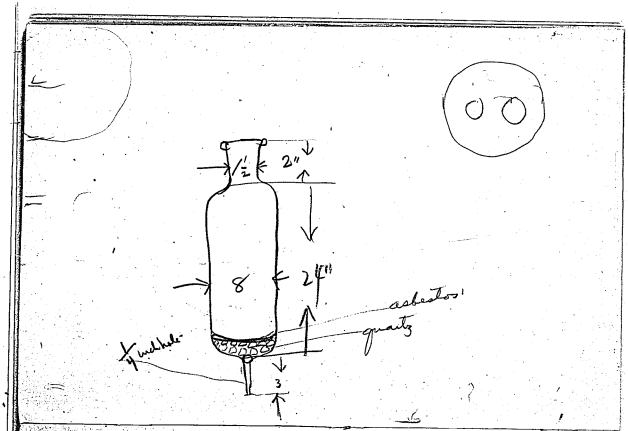


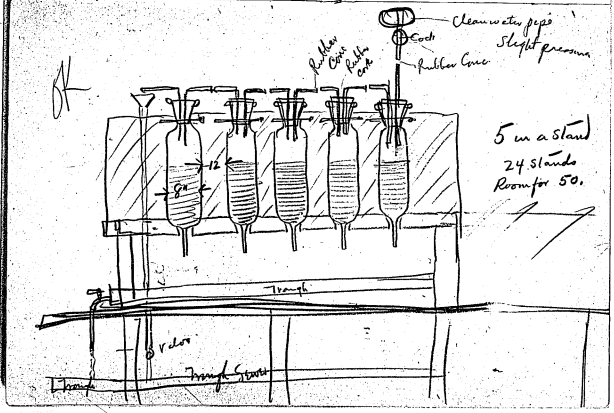

Coarse tuff
Lemp Alcohol

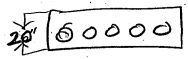

48 Hours -
Percolator -
24 stands of
5 each -
Separate trough
each slt.
5 on a gang -
trough -
Bench
floor

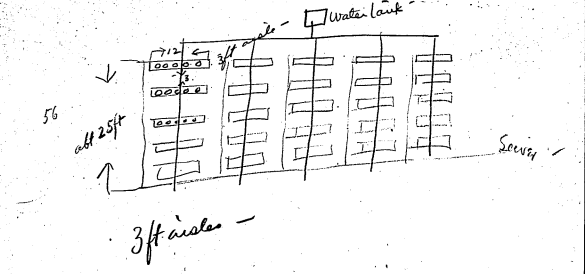




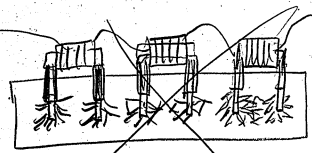

1/2
2"
8
24"
asbestos
quartz
4 inlets
3


Clean water pipe
Slight pressure
Cock
Rubber Cone
Rubber Cone
Rubber cone
5 in a stand
24 stands
Room for 50.
12
8"
Trough
Trough Stand


20'
60000


Water tank
3ft aisle
7'12
56
abt 25ft
Sewer
3ft aisles

How about a Cylinder of sieve wire — rotating for nickeling —



32 8
2 1/2
1 1/4
5/8
1/4

32
2 1/2
1/60
1/64
1/500

plating Cups

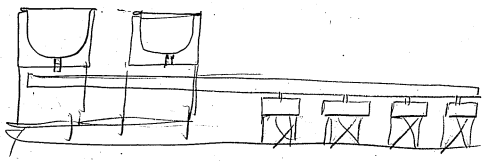
4 1/4
800 — 50
3 1/2
1/7000 250
1

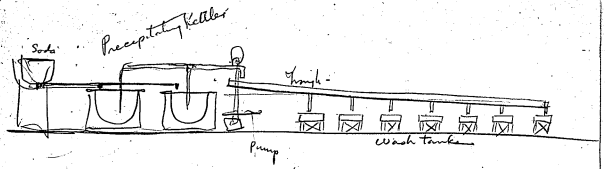
plating baths for 200,000 Complete Cups daily
or 400 000 pieces —
300 battery jars —
8000 grids —
" "
" "

Investigate as to best & cheapest way to handle this amount & space, power & devices necessary —

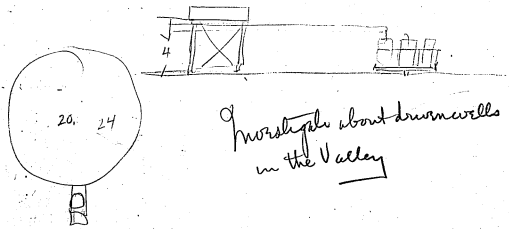
Mem Soda Kettle needs no heat, wants good
covered & Soda Lye to be drawn off at bottom by
a stop cock through an iron box filled with ~~[illegible]~~ Coke
& fine mesh screen — to filter chips out —
it should be piped over to precipitating kettles —
to save handling —

Sell the Corliss Engine —
Bring 100 HP direct Isolated plant direct Concd 125 Volt Outfit
possibly angle ~~[illegible]~~ Pulsometer if more can be used
& dynamos found to work direct,

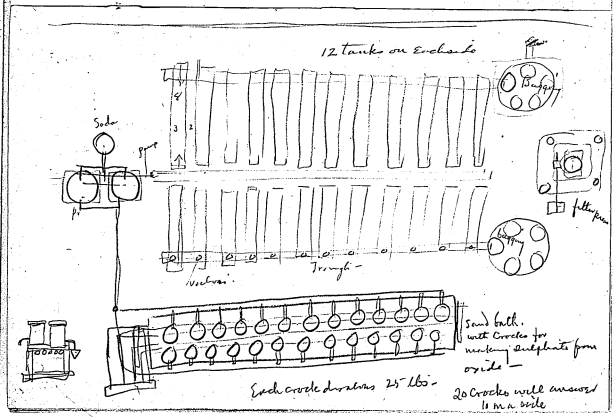




Steam jacketed or Steam Coils inside —
Can probably use those at
Edison — also Tank up
there for Soda —



Worksheet about drum wells in the Valley



Steam heat pipes etc get from Edison

also all supplies possible,

medical apparatus ware try tin see if stuff

(dries on steam bath good with tin – also try

iron pans, run in iron (plumbed to iron) also

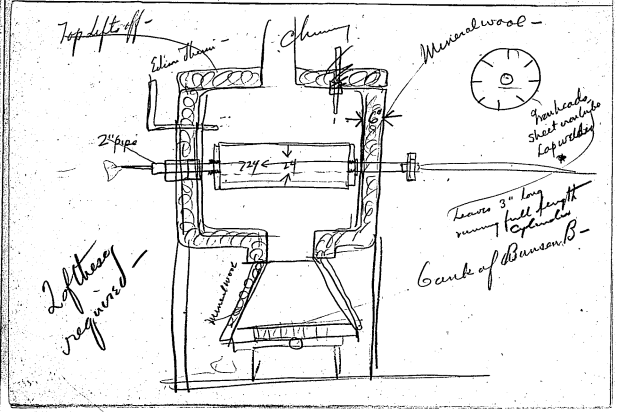
try agate = Commercial sizes of above

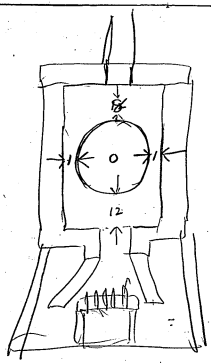
Ventilating

Exhaust fanes from Edison —

Why not get lumber from Edison by

running down a bldg —

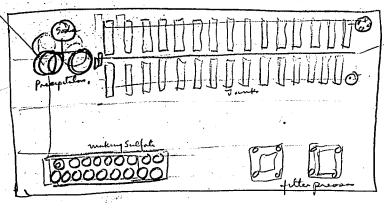



12

May want stirrers
Sources of steam

old Brick bldg
ground floor

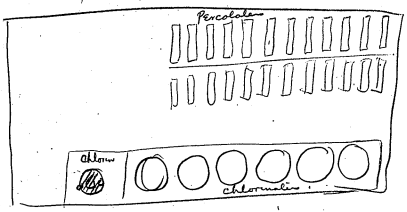
precip tank



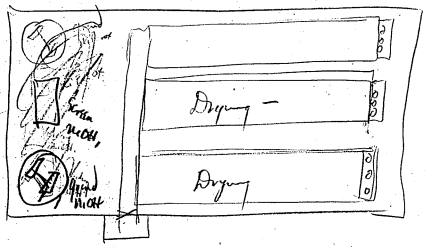
as there is an excess of the Sulf the batch should be pumped up to a settler tank but perhaps it better to leave it,

or run first washings into big tank + precip by soda + draw off precip at bottom

2nd floor old bldg

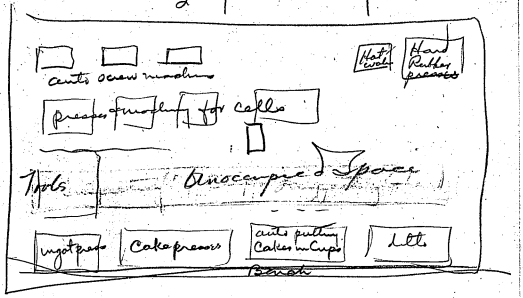


3rd floor old bldg

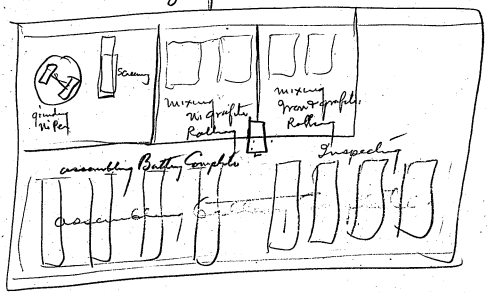


New bldg 1st floor

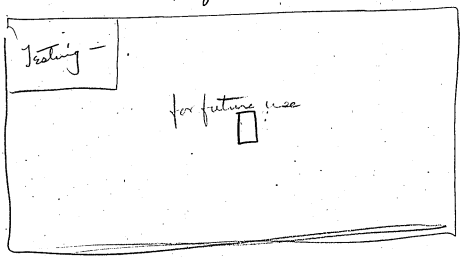
2nd floor new bldg -



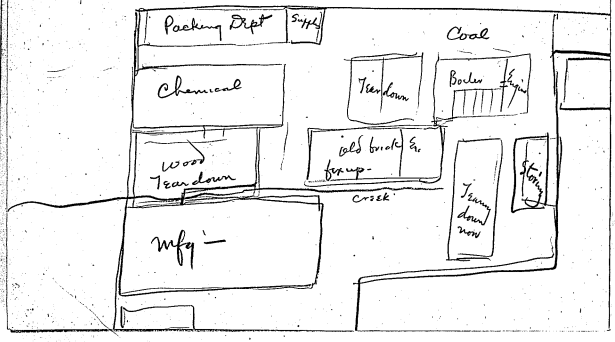
3rd floor -


Screening
mixing
Ni Graphite
Rolling
mixing
Graphite
Rolling
Inspected
assembling Battery Graphite

4th floor.



General Layout



Sealing jars —

The pitch for sealing showed 6% viscous at 30 below zero —
& not run at 212 must not be attacked by KOH —

~~Bird Lime~~

~~Orly Cornish~~

~~Albertus~~

Albany Grease,

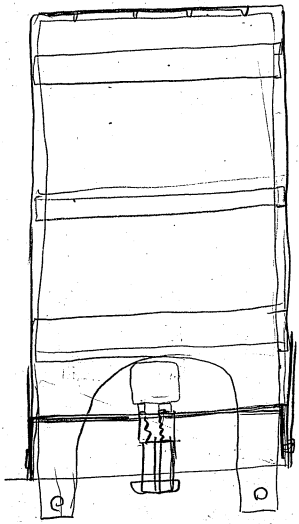
Rubber in Benzol with Asphaltum also clarified pitch,

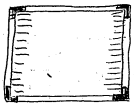
Howes Marine glue

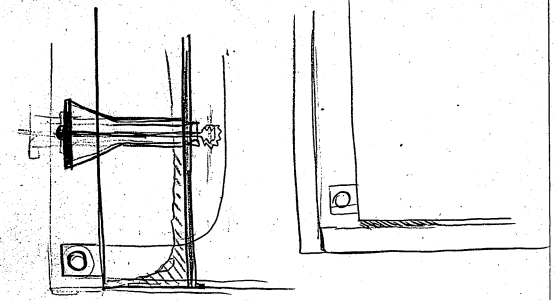
Sulphuretted Asphalt, same as Callender once gave me

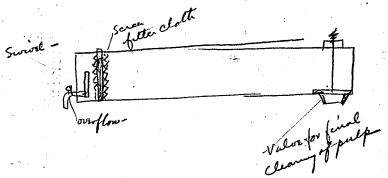
Balata,

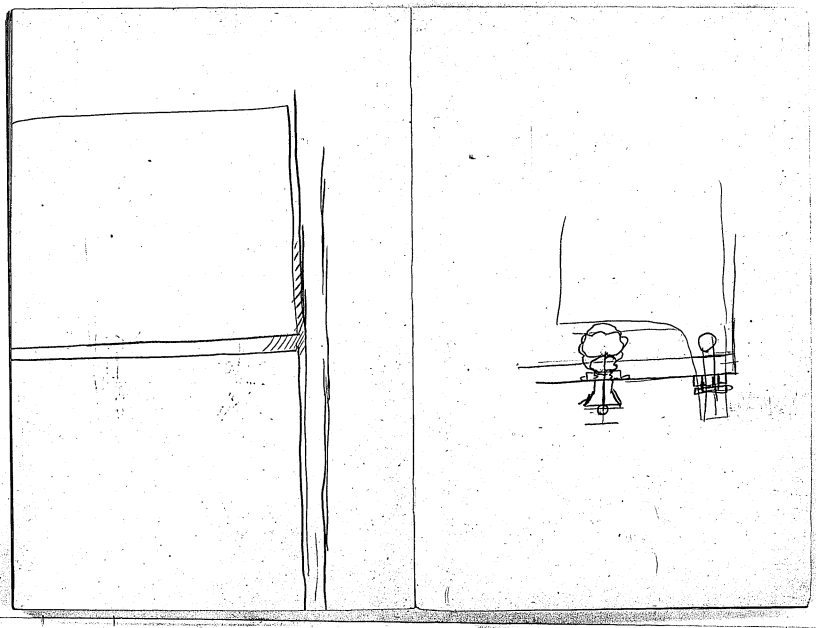
[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

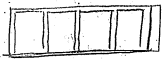


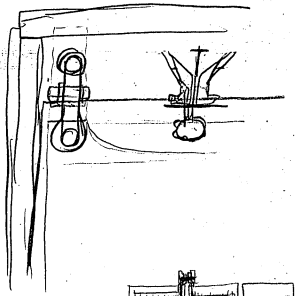


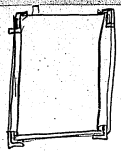



Swivel
screen
filter cloth
overflow
Valve for final
cleaning of pulp



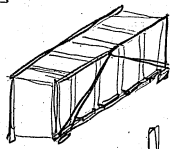






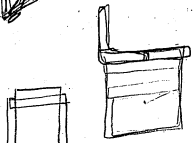
44/5

1220



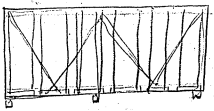
250

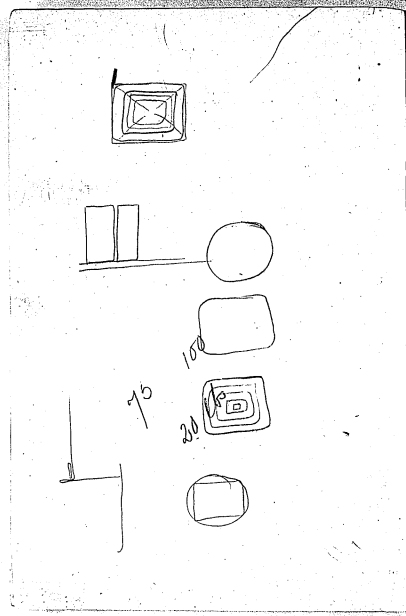
1 1/2

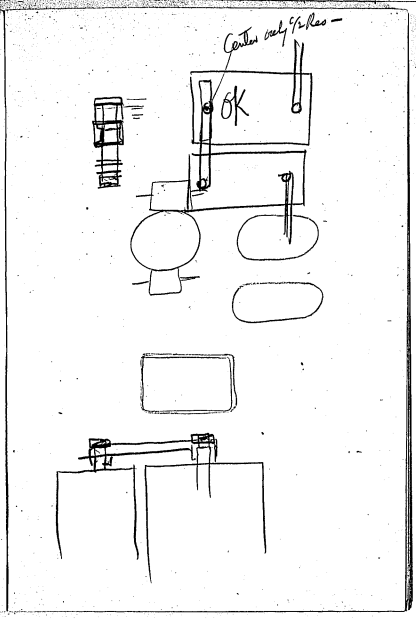


1000-

5/1500
300




100
75
20


Center only Fin Res —
OK

Saddle
Saddle Tropf
Lifter Cap
Screws
Bobbinphg

Notebook, N-01-04-23

This notebook covers the period April-May 1901. All entries are by Edison. The book contains notes and drawings regarding thermocouple experiments. A few entries pertain to phonographs and to drilling technology, probably for Edison's ore milling or cement operations. Also included is a draft of a lecture on alkaline storage batteries, prepared by Edison for presentation by Arthur E. Kennelly to the American Institute of Electrical Engineers ("The New Edison Storage Battery," *AIEE Transactions* 18 (1901): 219-30). The pages are unnumbered, and the book has been used in both directions. Approximately 90 pages have been used.

1800

460-
25
2400
760
1200
1120
2240) 5535
1120
4220
4200
1200

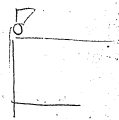
535-
340
2140
1605-
1717.

40 Cranes
16 X01 - Elev
5 R Feed I Elev -
20 X02
20 X03
8 Cons 3 -
6 X00 1 & 2 C.

115 --
5
10
10
20
50
10
210
210
420

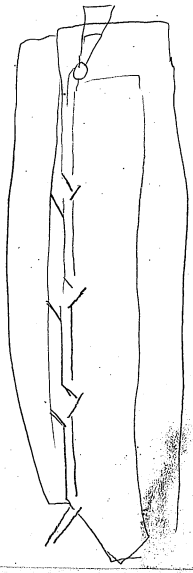
4 2240
8960
4) 3700) 5376 00 (16
3300
2060

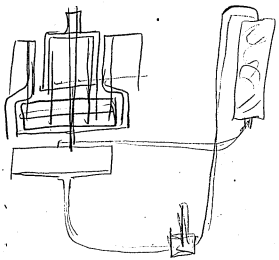
$16

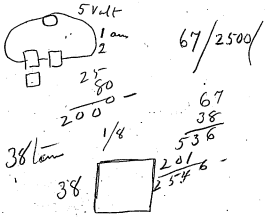


2970
1000
3900
26
3120
444
78
1185
88
67 -
87/0 -
555-2
444
64 3970
3108
2667
2,974 . 3900

cloth






5volt
1 am
2
25
80
200
1/4
38 lam
38
67/2500/
67
38
536
201/6
254

The way

24
3
32
59
72
28
6
132 - 2 ox

27
32
59
72
18
34
132

Acetate of mercuriammonium very sol in water Watts 17 Vol 1

Cu ~~precip~~ Reduces Sol from Nickel ammonium

" " arsenic from Sulfite when hot +

" molybdic with HCl -

Arsenic Hydrides one gas other solid

Solid is made by using metallic arsenic as Electrode at positive pole -

Why not use this as Cinchona Tablet -

Benzomercuriamide very Sol - Watts 1 - 539

Cop precips Bi from Sol in metallic state

Bismuthic oxide Bi_2O_5 is reduced to Bi_2O_4 at 100 cent, Try sort B - Carbon

Try Ferric chloride on Carb - pp the Ferric ox in porous mass it will be dry Electrode

Platinum Carbon Coil in Chlpt
then ignite in charcoal – Carbon charcoal itself absorbs
H_2O with Try battery
40 Volts NO – See if NO is oxidized & its exothermic –
deoxidized easily

Make Electrodes of Cocoanut charcoal

~~Chl Ammonia Carb [illegible] fine~~
~~Metmorphine S.A. 4 Vol. which [illegible]~~
~~Tryphal [illegible]~~

NG

Try Cd a Hg Carb. Elec in
strong Carb Soda dittos
Zn & Hg Carb Elec
insame –

Try Molybdenum
antimony + Copper on Carbon
plate against Cd —

For Carbon plates - Examine under
Microscope - Try hydroxides of Sr Ba
Ca + have Freddy test them -
also heat chalk full red
with carbon
plate some —

Try experiment passing dry NH_3 & CO_2
into a chamber 1 sec of get
powdered Carb NH

Put a pair of 4 gram Carbons
in 30% KOH + put heavy current
1/2 amp 4 sec of C discharge & change
solutions when get too much
colors

60-

4-

$18.

5

30.

1.25
40
50 0 0

20-

70
20

1.75

60-

44 | 750 | 17
94
318
30

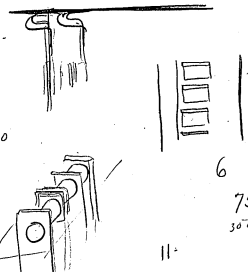
23 | 750 | 32.5
69
60
60
70

24
16
144
24
3 6 4

2 2.6

75
1 5 3 6
1 5 3 6
1 6 8
1 4 0
1 9 2 0
1 4 4
4 8 0
4 8 0

125



200

6

750
40
300

11.

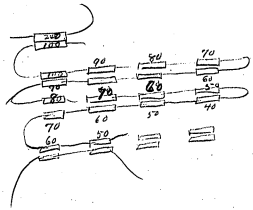
64
40
320.0

384
40
1920

384
40
153.60

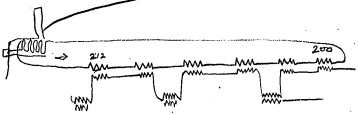
64

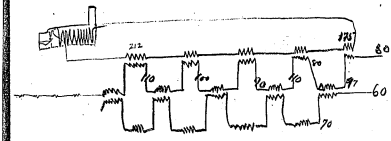
$153.

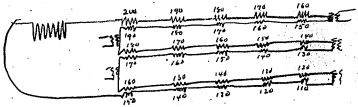


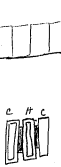
April 23 1901

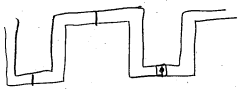
Thermo Gat

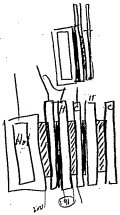












Evidently a fall from 212 To 80 would give same Volts on one element, with somewhat higher Res that the value of element from 212 To 80 would be. Evidently there is only one principle involved here; Res to Elec is ~~not~~ same as to heat but the rate of loss that counts, the principle almost makes the two both Economical

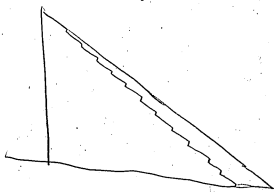
Multiple 14 turns heat - series more voltage

10 sec. 100 fall 212 to 80 —
as against the whole in multiple Latter fall 212 to 80 —
100 times the amount of heat, 100 times lower the Rise
so apparently gets same result,
but electric raw is a annual defeat
as compared to rapid heat Conductively

~~[illegible] of 212 to 80~~

The only transmitter of heat to E latter
placed at generating, hence if you have
a fall from 212 to 80 through 10 pounds
you get ~~no more~~ more amount of Watts
in first less but you have lumm
more heat into E —

4 20 33 Jots inch 4" 120 alternations



Heat transmitted from Water to Wall
thru plates 400 to 600 Heat units
per 0-gr foot per hour per
degree of def of temp
while from hot air to Water only
5 Heat units =

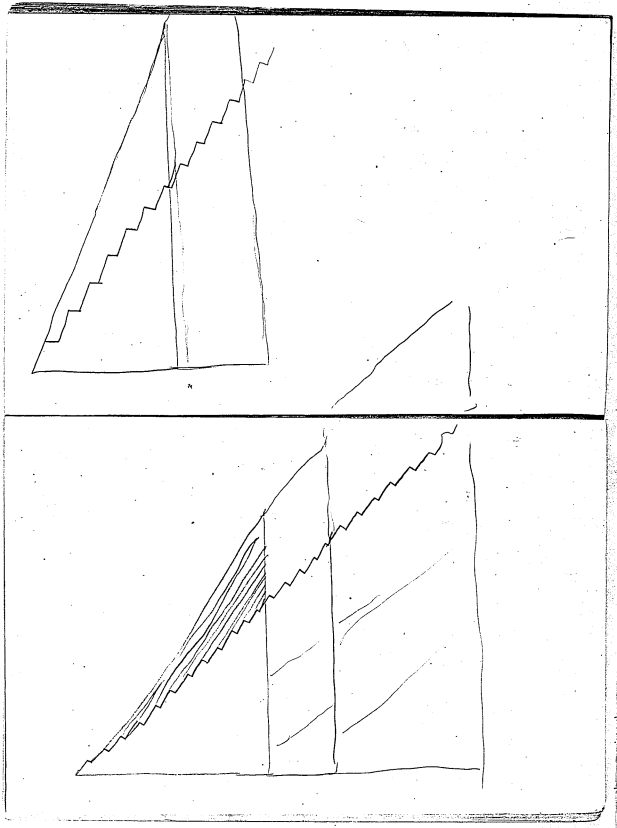
10'000 heat,

746 — abt — 1 HP per hour per deg
150 HP per hour for 150 deg
on 1 square foot, 90'000 Heat
9 Lbs Coal =

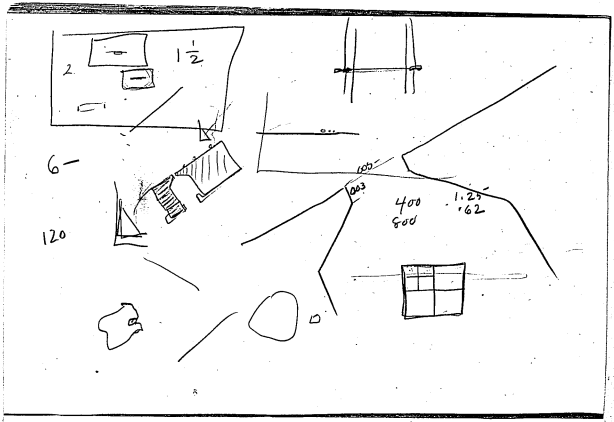
600 | 10000 / 6000 / 90000 | 16.

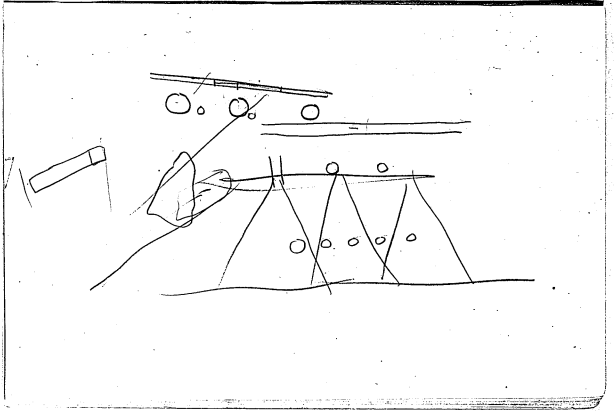
150 600 90000

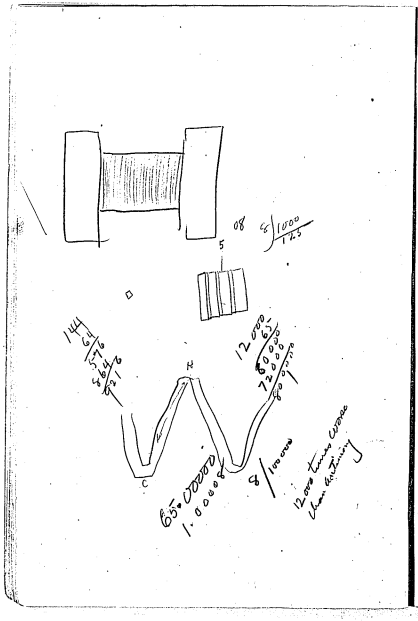
16 | 150 | 10

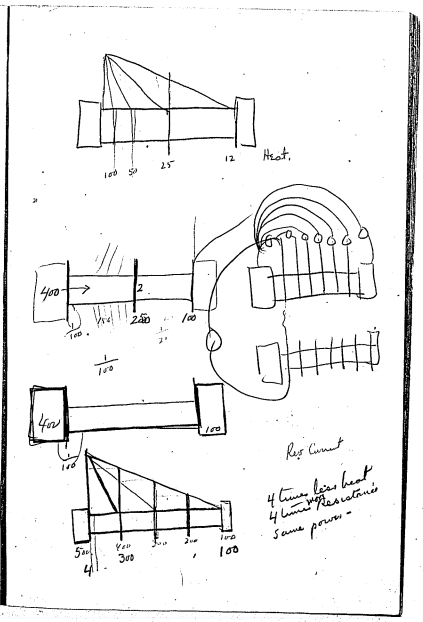


6-10


2
1 1/2
6
120
100
003
400
600
1.25
.62




5
08
1000
125
144
576
3456
20
12 000
60 000
720 000
60 000
H
C
8
100 000
65 000
1.00000
12 000 times current
than distance


100
50
25
12
Heat.
400
2
100
250
100
1/100
400
100
100
Rey Current
4 times less heat
4 times more radiation
same power -
500
400
300
200
100
100
4

Pass. NH_3 over Ferric –
" CO_1
Cy

Do from reducible by Mg alone Zn

" Ferrous ox from Hornblende
Eat silica by Hydrofluoric –

Trying to sep Fe_2O_3 by
Magnesia hydroxide & Sulp Iron
Use Ferrous Sulfate,

Precip by NH_3 Some Ferrous
Sulphate in strong Sugar
Salts + boil hard,

Precip Sul Ferrous in boiling
Rock Candy Sugar
with Tartaric acid

13 lb Lot. ~~Chlorinated~~ Nb_2O_5 -
powder fine + boil in 5% KOH,
dilute this + filter off —
test for Sulphuric (+HCl) acid
Think there is basic salts in
both, + it may be necessary
to ~~boil~~ soak the Nb_2O_3 with
1% KOH + then re percolate,
Might take some of the 13 lot
now percolating + when
finished - put some back +
percolate with 2% Sal KOH
+ afterwards Water —
Make Na amalgam + squeeze
dry out =

21 lb —

21) 12 / 16 / 12 / 1,989 (9

9) 746 (82 lb

160
40
64
640
704
8960
746) 9,43
8960
2984
2984
1327

14
17
746) 9,43 (80 lb
746
1944
1944
26
26.73
26.
52
Cu

240
480
7680
1440
1440
32

440) 7680 (17

4 lb. 8) 200 / 25

3½ lb

1
50 sp pounds
23
7

Try ordinary KOH alloy of
Iron + Aluminum
" Zinc —
" Lead —
" ~~Spinel~~

The al Zn Pb will dissolve + leave black powder iron —

Make grid Cupric hydroxide green + oxidize up by Current, Jelande —

Reduce ~~Fe Cl~~ ferric Cl by H. to

~~Try grid with Fe Cl, heated to 200 w/o~~

Reduce phosphide Iron by H —

Make some ferric + Keep on hydrogen at 900 for 5 hours then cool + Keep in 6 more — Idea Can Iron reduced to metallic —
Iron low temp may be oxidized
Must dry the oxide must be very fine

~~Examine filtering~~ —

See Dyer foreign patent —

~~see about Cooling chamber~~

~~see about Const map~~

Make: Cupric Cu_2O_3 grid —
Ni Hydroxide grid & change
"
"

See about new Hematite mag change
how it works so can order steel ones

see about Magnetite separator
Mag Heater is doing —

Write Brooklyn Pattern man tell
him what we want for chlorine
generator —

~~Have Dyeing room~~ —

get W + Chapman man + start
in 1st batch stuff — so as to
get ready for dyeing —

Treatment of 5 lb batch Peroxide
with soda after powdering them
redry + make good soda squeeling
of Curve —

get Benson enough Mn perox
for engel - Freddy mix & grind
in regular way just as we put
in grid -

See Dumphus about new Coal
house change -

See Drewenald & get goodame
tank ok -

Have chemist make some
Cement from our rock
Enough to make test brick -
find Newberry book where he
made the experiments -

Test alloys & [illegible] some
perhaps Spiegeleisen dis in acid
deliverate Fe as acid drill 1st
go for Mn

By heating ferrocyanide to redness a compound of C & Fe attained possibly Fe can be oxidized by current

grid with precipitd dried ferrous carbonate, put in boiling KOH 20% & reduced by current.

" grid with ferric ox dried & boiled in Tartaric acid in KOH – to reduce to ferrous chl –

Zinc immersed in a perfectly neutral sol ferrous sulfate in a closed bottle throws down insoluble Fe with oxide which deposited partly on the Zinc & on side of bottle –

grid with ferrous sulphite –

also ferrous " to 800 in tube

Weight of battery Box
Oak - 4 lbs for 2 cells —
44 cells weigh about
" 85 lbs without the top.
100 with top —

12 HP hours above for 8½ lbs per
hp hour - for wood -

Through coke say that
Cost Box including Carbon
23 Cents. 100 lbs $6.00

24
54
96
1296
129.6

264

25.0
1320
132.0

35
42
129
206
32
12
4.2
6.39
453

1.75
124
70
350
42.0

60
49
109
8.4

14.3
5.5

20 lbs

453 | 6.39
453
1962
1812
150

Weights 2.83 oz
453 gr

One cell —

Box 1
2 pounds
Iron jar 264 grams
Wt of Empty grid 35 grams
Wt of Cups 1.75 each
Wt of Iron Cake 6
" Ni " 4.6

lbs 7.8 Iron grid complete:
Cupcake grid 186
35
221

186
6.32

221 grams

lbs 6.5 Ni grid Complete
Cupcake grid 187
453

187

Cell 9.3 oz
Box 2 lbs

0031

25

10. $2\frac{1}{2}$

50

7" 2

125

60)17.00(2.9

125.0
102.0
9.3
80.0
8.0
1.0
3.0

16)328.3(20 lbs

32

125
102
22.7
16
6.4
6.4

16)

Wt

Cell	9.3	3
Box	32.	3
Iron grid	125	3
Ni. "	102	3

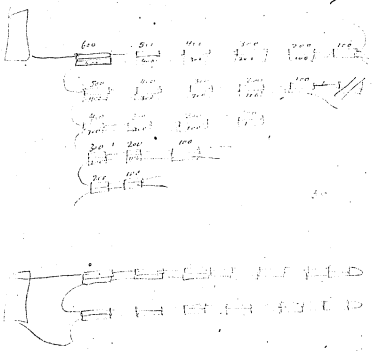
16)268(16.75

16
108
96
120
112
80

16.75 lbs per Cell
(without Liquid)

4 lbs liquid

Thursday May 10 - 1951



Magnetic Storage Battery
" Battery
Iron Battery -
Electric Condenser
Condenser
Nickel Iron Battery -
Condensing battery
Condenser -
Nickel Battery

I present this evening to the Society a new and novel ~~of~~ combination for Condensing or storing Electric Energy ~~which is by Dr. Dixon~~ invented by Edison and which is adapted for all kinds of Electric work and is especially valuable for ~~motive power~~ Vehicle Traction, It contains all of the elements which go to making it a permanent ~~commercial~~ and so far as now known ~~and [illegible]~~ has no determination, Mechanically Chemically Electrically & Commercially it bids fair to be all that can be ~~[illegible]~~ desired in the present state of the art—

~~many~~ The Lead battery has been constructed in every conceivable form since the invention but so far it has not been as satisfactory as could be desired. Especially so in Vehicle Traction. It would seem that the very nature of the Combination & the Chemical reactions were against its successful perfection —

Many attempts have been made to perfect Storage Cells of the ~~[illegible]~~ Alkaline Zincate type, but the great difficulty of ~~that~~ depositing Zinc out of solution or in a Coherent form & the absence of a good depolarizer whose Oxide is insoluble in the Electrolyte, and the large amount of liquid necessary to ~~[illegible]~~ dissolve the Zinc has made this type of Battery obsolete —

Edison set down certain ~~[illegible]~~ ~~[illegible]~~ requirements necessary to the perfection of a Commercially Valuable Battery without deterioration

These requirements ~~were first~~

first. No deterioration,

2nd Large condensing Capacity per unit of weight

3rd Rapid charge & discharge

5 To require No attention ~~requires to effect~~

6 - Cheapness

The Cell which is here presented Mr Edison believes comes very close to these requirements —

The cell is composed of 16 ~~the~~ negative Electrodes & 16 Positive Electrodes — placed in an iron cell, The Legend being a ~~[illegible]~~ 20% solution of potassic hydroxide —

~~The weight of the cell complete being [illegible] the total [illegible] [illegible] the Capacity 200 watts [illegible] [illegible]~~

Voltage about 1 volt

Its weight per horse power hour is ~~from~~ about ~~to~~ ~~lb~~ ~~—~~ to ~~to~~ lb per horse power hour it can be made very much lighter

- a cell having a weight of 17 lbs

gives a

~~The~~ Normal discharge rate is 75 Watt amperes — it can be discharged at 200 ~~or more~~ ~~watt~~ ampere without harm to the ~~battery~~ cell —

It holds ~~up~~ "high" percent of its charge for many weeks —

~~The first~~ The cell as it comes from the factory is assembled from the terals and shipped dry — The user adds the liquid & it is ready at once for use after charging

~~A solution from the factory~~

The Negative Electrode Consists of the anhydrous oxide of iron, of the lowest stage of oxidation probably ~~and~~ Fe_2O which is capable of being reduced to the metallic state in an alkaline solution. ~~Electrolytically~~ all other oxides both hydrous and anhydrous are not reducable ~~in solution~~ the iron reduced from iron compounds by hydrogen is not oxidizable —

The Negative Electrode Consists of the hydrated ~~peroxide~~ superoxide of nickel ~~NiO~~ NiO_2

which when suspended to Electrolysis in alkaline solution is reduced to a lower ~~black~~ oxide — probably Ni_2O_3

The Cell when charged will have a as negative element of finely divided metallic iron — the positive element finely divided hydrated ~~Superoxide~~ of Nickel — NiO_2

When discharged the iron is oxidized to the lowest oxide of iron while the hydrated Nickel superoxide is reduced to hydrated peroxide

The alkaline liquid performs no other function than the Electrolytic transfer of oxygen from one element to the other — when charged or discharged and in all intermediate stages the solution is unchanged — hence the quantity may be as small as mechanical consideration will permit ~~and~~ the only ~~change~~ attention the cell requires is that

it shall be kept filled with Water to take place of that lost by evaporating or exchanging

Iron or its oxides & Nickel & its oxides are insoluble in the Electrolyte, ordinary Metallic Nickel & iron are also passive in ~~contact with~~ the Electrolyte when subjected to Electrolytic Oxygen — and no amount of oxidation ever weaken have any apparent effect upon either metal ~~yet and with that which the Iron~~ ~~Cement~~ ~~These~~ Iron is used as the mechanical support for both Elements ~~&~~ is coated with a slight deposit of Nickel to insure good Contacts — The finely divided material of both Elements are mixed with ~~flake~~ specially prepared flake graphite ~~of Carbon~~ the particles of which are larger than the perforations in the pockets of the grids

The proportions of active material ~~[illegible]~~ ~~[illegible]~~ of Cake graphite ~~[illegible]~~ are by weight 1 parts of active material & 3 parts of graphite. The bulk is of Each is nearly Equal — The whole are mixed together in such a way that the faces of the graphite is covered with the active material — the whole being dampened — a special mach ine mould. the material in Cakes with a pressure of about 2 tons per square inch — ~~tons~~ a cup of the same homogeneous the Cake is made in two parts the faces are perforated with minute perforations. the Cake is placed between ~~in~~ the ~~two~~ two parts of the Cups. ~~three~~ there are 24 Cups in Each grid or element, the Cups are assembled into the grid & the whole subjected to a pressure

~~Not~~ There will be
~~an action between the two complete~~
~~Zinc | graphite | steel~~
~~[illegible]~~ Iron of all the metals
is nearest to ~~the~~ Zinc in the Electrolytic
series when in Alkaline solution
its voltage being superior to Cadmium
and as it is just below the water
decomposing point there is no
local action between it & the graphite
This is of great importance as
will readily be seen
as The Nickel is ~~not~~ reduced to the
metallic state of course local
action does not take place
between it & the graphite
The cathode Combination of Iron
Nickel & Alkali is unique
~~[illegible]~~ for the purpose
of storing Energy

of 100 tons, this crimps the pockets together
& to the support in a most perfect manner —
The metal of the Cups is of Crucible Cast steel
is corrugated, ~~for~~ changes & discharges
the active material expands & contracts
but the amount of contraction & expansion
is well within the elastic limit
of the steel walls of the Cups hence it
follows these changes & perfect
Contact is always obtained
~~This important function~~ The importance
of this will readily be seen
When the battery is fully charged
the gassing takes place ~~[illegible]~~ mostly in the
metallic walls of the support of the
pockets, no disturbance of the
active material takes place
no matter how strong the gassing may be
~~The~~ The transfer of oxygen
Ozone to take place ~~[illegible]~~ on the
principle of transference like Cementation
in steel hardening —

The Cell may be rather called a Condenser than a battery so called as it action more nearly resembles an ordinary Condenser —

The resistance of the Electrolyte ~~Cell~~ ~~[illegible]~~ Practical Constant, and is very low about ——— ohm —

The discharge Curve at Constant amperage is shown in figure 1

Fig 2 illustrates a single grid complete

Fig 3 the pocket in two pieces with Cake between —

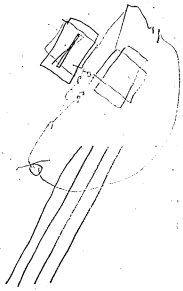
Mr Edison gives me the following interesting results obtained in his experiments with connected with the invention of the battery

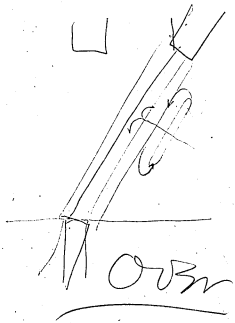
Iron reduced from its salts by hydrogen to the metal is not ~~reducible~~ is not oxidizable by Electrolytic Oxygen in alkaline solution, the reason is unknown

~~The oxides~~ Hydrated oxides of iron are not reducible

Anhydrous ferric oxide or the magnetic oxide are non reducible no compound of iron is reducible except ~~Manganese~~ ~~of~~ The lowest anhydrous oxide a small ~~[illegible]~~ quantity of which is present in scale oxide of iron which needs under certain conditions — and in larger quantities from the reduction to a certain point by hydrogen at certain temperatures & under ~~proper~~ Conditions of the ferric oxide obtained from the ignition of ferrous oxalate in air

~~The oxygen [illegible] of ferrous oxide is [illegible]~~





All nickel oxides made by by heat or in the dry way are practically inert when subject to Electrolysis in alkaline solution

The sesquihydrated sesquioxide Ni_2O_3 made in the usual way does not act as a depolarizer in alkalis.

~~It is also proved~~ The only other compound of nickel which can be used is the monosulphide which when subjected to alternate oxidation & reduction in alkaline solution has the sulphur eliminated & the resultant oxide is capable of being used as the nickelic state, the metal is oxidizable & reducible therefore ~~The oxide [illegible] oxidation of the [illegible] lyser~~ ~~[illegible] lyser~~ ~~[illegible] to possess in alkaline solution~~

~~Formula~~ ~~Nickel sesquioxide Ni_2O_3~~

All Nickel oxides inert in the dry way or [illegible] in alkaline solution, ~~[illegible]~~ ~~Nickel [illegible]~~ Ni_2O_3 does not act as a depolarizer in alkaline solution - when this substance

~~Under the Zinc~~ by one method of forming the hydrated sesquioxide Chemically ~~[illegible]~~ a small quantity of Superoxide MnO_2 is formed at the same time, This acts as the depolarizer, but the Current almost wholly changes the Sesquioxide to Superoxide,

is used & put against zinc in an alkaline solution ~~[illegible]~~ it gives only a slight effect, ~~[illegible]~~

~~[illegible]~~

~~[illegible]~~

Lead peroxide in alkaline solution is not so powerful as the Nickel Superoxide the latter is nearly endothermic

Cobalt acts like Nickel in forming a Superoxide but it is not so powerful, there is a slight solubility in the alkali & the cost of the metal is too great for practical purposes

of lead peroxide under the same conditions. This oxide is nearly + may be an endothermic substance, by special conditions this oxide can be changed ~~[illegible]~~ to the higher oxide ~~[illegible]~~ the composition PbO_2 commercially ~~[illegible]~~

Cadmium Zinc The ~~[illegible]~~ Hydrated Superoxide gives ——— Voltage —

Cadmium ——— Voltage —

Cobalt Hydrated peroxide is like the Nickel peroxide but can be reduced to the higher oxides, partially by changing or changing the Nickel ~~[illegible]~~ the same Voltage — It is slightly soluble in alkaline solution ~~[illegible]~~ to scores + dear to be used

A nickel Element after use
Can be taken from the Cell &
dried in the air, transmit whether
Charged or discharged without
any deterioration or change
noticed when replaced & used
The new Element Can also be
taken from the Cell, dried
in the air for a week or originally discharged
there is no change of it charged
it loses its charge, but no
deterioration takes place when
placed in the Cells it acts
just as before when charged
when users ~~prevent the cell~~
fail to keep the cell full
of water —

150
150
750
750
22500
1800
4

60) 37

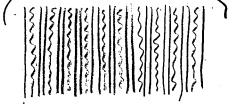
Note = Boil Copper in Cinders
for up a jamming device —

The following oxides of the metals are valuable in electrolytic work in —

Aluminum
Zinc
Tin
Lead
Antimony
Cobalt slightly
Silver
Mercury slightly
~~Bismuth~~
~~Iron~~ Chromium -
The metals unworkable are
Copper, Nickel Iron & Cadmium —

deterioration rapidly increases with the solubility — as there is a constant plating out upon the Exterior of the Electrode, in a powdery form which from time to time becomes detached & drops off + the interior of the active material becomes [illegible]

10 Fe 20 ni —



220. 00a —

144 / 1100" (4 ft
144 / 550 (4 ft

44
25
220
165
275
25 / 1375
25

25 m amp
44
100
100
100

100

4 / 550 - (13 amp
40
150

48
60
384

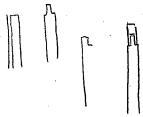
150 -

88
60
5280
3840
912

91 -
10
10
10

25
25
125
25 / 625

44"

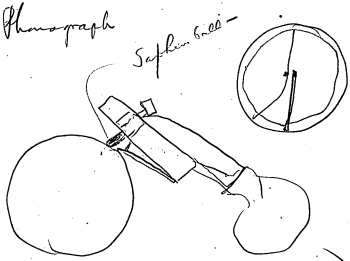


10
1.25 Cents
9/16
20/16

500
150
101
222
1776
1728
384000
2 2/2 tm .005-Thick

Phonograph

Sapphire Ball



ball rests on Cylinder - Depth Dampened
in any manner required -

24 48 / 24 / 192 / 96 / 1152

64 / 4 / 512 / 32 / 2560 / 1536 / 1920 / 1920 / 0

113

453) 17920 - (39
1359
4610
4077
533

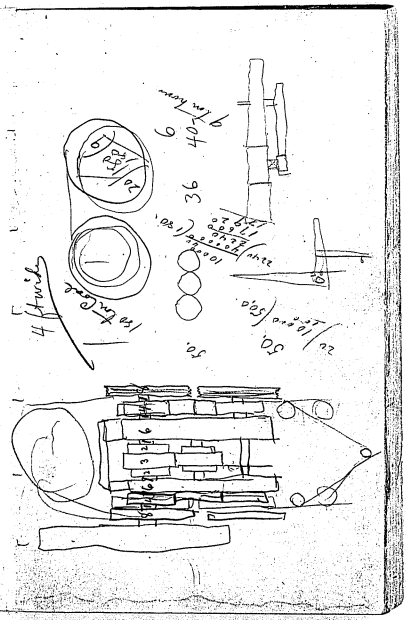
45

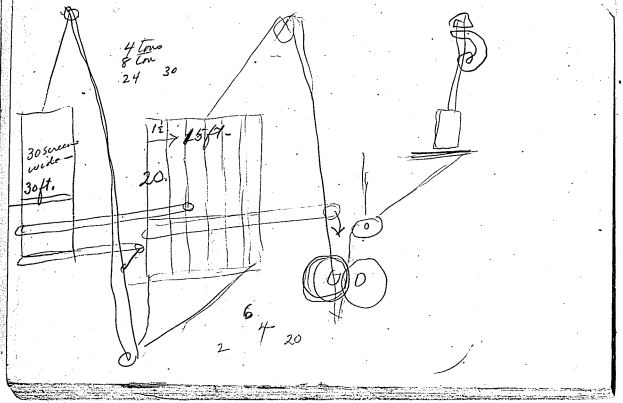
16) 17920 - (1120
16
19
16
32
32

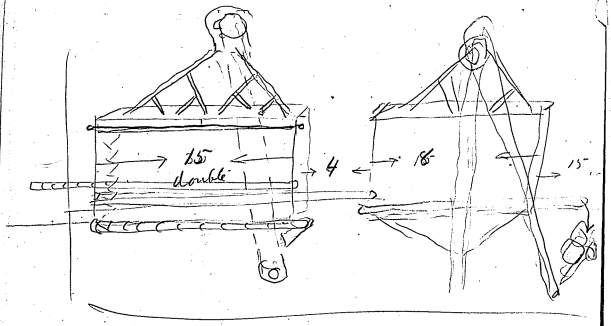
	grammes
Weight steel jar top	364
" of grid alone	35
" Cups on each grid	42
" Briquettes on one grid	132
" 36 Rubber separators	272
" 32 grids complete	6688
" ~~Wax~~ Ceresine	140
" Solution -	[redacted]
"	

19.91 lbs ~~[redacted]~~ 19.9PT

[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]




4 Tons
& Cu
24
30
30 screen
wide
30ft.
1½
15ft.
20.
6
4
2
20

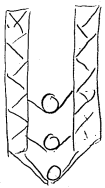

15
double
4
18
15

$600 Day 65 ft. 9.2 ft

20 lbs By Hole

$240.

cut of rock in hole 80 lb.



Drillin	175
Helper	140
Blai	80
Repairs	60
Dipen	25
Hose	20
Oil	14
Waste	3
Drill steel	80
Blacksmithing	55
	602

56
20
14)1120
12
80.
3
12
20
24

25
13
75
25
32
4

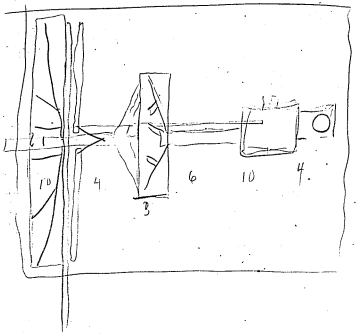
26)330
55

1 2
22
2420
3 2
48
2640

768.
190 3

6,5)600
585
15 00

9,2.


10
4
3
6
10
4.

9
20
14

92
20
184

16
20
320 (2248) 180 (12.8
14) 280 140
40
280
120

~~60 foot cut.~~

Holes 3 ft apart 3 back ~~9 ft~~ 20 deep 180 cft. 12.8 tons

Dynamite 2.40
Drilling 1.84
Loading 20
12.8) 4.490 (35 cents ton
384
1 690
64

4 apart 4 back 20 deep 320 cubft 22.8 tons

~~Dynamite 2.40~~
~~Drilling~~ Cost
22.8) 4490 (197 19.7c ton
228
2212
2052
1580

5 X 5

```
      25
      20
14)  350 (35.7
     280
      700
      700
        0
```

```
35.7 (449.0 (12.5
     357.0
       92.4
      71.50
       20.62
        4.2
```

12.5 cts 1m

6 X 6

```
      36
      20
14)  720 (51
     700
      20
```

```
449 (8.8 cts 1m
408.0
 41.8
```

~~449 (4.4 cts 1m~~

```
~~440~~
     9.0
```

7 X 7

```
      49
      20
14)  980 (70
     980
       0
```

```
449 (6.41 cts 1m
420.0
 29.0
 29.0
  1.0
```

7X8

```
      56
      20
14)  1120 (80
     1120
        0
```

```
449 (5.61 cts -
400.0
 49.0
  1.0
```

97 Dutman ST

in KOH, with glycerin CuO is very soluble +

Ferromanganese true Chem Compounds get some —

See Tim. under Heat 3rd Sup says the affinity for O greater than Cd —

Not only try CuO with acetate Hg for Delaunys battery — but see if CuO_2 can't be made by using Hydrogen peroxide —

---

acid Potassium Vanadate in Contact with Organic matter is ~~[illegible]~~ affected by light — ditto neutral Sodium Vanadate must be low heat of formation like silver tool with Vanad — salts — Can the

Ferrous Oxalate affected by light — (Vide Blue print paper)
Try Gallery —

Hyponitrite of Sodium — or K
Made by acting on Nitrite Na
by Sodium amalgam the solution
after acidulating with acetic
a gives with Silver Nitrate
a yellow pp of Silver Hyponitrite
& then — see 3rd Sep 1408

use for Ethereric Redg Ball

Warm aqueous CyHg dissolves
large quantity of Hg Oxide Red
its an alkaline Sol — deposits
Oxycyanide Hg on needles —

$HgCy_2$ forms double salt with $CHCl_3$
Shake with alcohol —

$HgCy_2$ Key —

$HgCy_2$ forms double salt with formate
of NH_3 ditto for K —

Mercuric Chloride in alcohol
Saturate Carbon dry & neat
as much as possible then
~~pass~~ put over ammonia gas —
also try painting after dry
with strong NH_3 — ~~then~~
Dry diffuse heals —
Try formate & Heat to drive
off H_2 acid & reduce to
metallic state

1½ 3/4 36-

1" 1

75 grms

100 16- 16.00

16

17.40

Soak acetate Hg - Dry & put in Water reduce by H - then dry add more acetate, & Reduce by H + so on —

Try acetate with acetate NH to increase solubility — & then decomp at 350 or 4 deg Fahr & retrial —

Notebook, N-01-04-24

This notebook covers the period April-October 1901. At the beginning of the book are notes by Edison regarding storage batteries, including entries detailing the use of cells by the Edison Electric Illuminating Co. of Brooklyn. Most of the book contains an enumerated log of 551 nickel grid experiments. The entries are primarily by unidentified experimenters, although there are some entries by Edison. Only the pages that include the Edison entries, experiment numbers 1-36 and 477-509, have been selected. Inserted into the book are two loose pages containing Edison's plans for an iron ore separation plant, probably in the Dunderland region of Norway, along with several pages of notes by Edison relating to the nickel grid tests. The front cover is marked "April 01." The pages are unnumbered. Approximately 100 pages have been used.

61115
191
1
227

apl 24 1901

Information on 12 12000 Hp—
Chloride Cells— Edison Illuminating Co
Bklyn—

The contracted to take Cells for boats
on repair for 5 yrs at 6% but
1 immediate contract yet will be given
that period —

2 Started to clean battery of
150 Cells at one of the stations
& not weak — after 3 yrs
run got out of every of cells
one tax of mud sold it for $20
per ton —

3 Tests made within last 60
days shows

3 Heal Battery guns

5570 Hp hours on 10 hour discharge rate
2240 " " " one " " "

Co

Weight of 156 Cells across 3 wire system
2400 lbs Each — Weight of plates
1400 " "

Paid $60,000 for the act,
Act up - or 16 c lb for plates Cell
Liquid + all Complete

Weight per Hp hour 10 h discharge rate 67 lbs
" 3 " 107 "
" 1 " 166 "
"

Economy at 10 hour discharge rate 78%
" 3 " 60 "
" 1 " 52 "

One set Gottens take up 30×60
~~but~~ 1800 sq ft but 1500 would do

The have one man on to run whole
set frequently, he runs distilling water
= have use high price acid

Worst troubles is with wooden cells
all rotten Can stick Can thru them
worst on top – Cover cell with
Corrugated glass it spits from
growing ends wood Good at top
lead don't leak – all wooden tanks
rotten – They keep painting them (and prop)
got big ventilator in room

Bardow says ideal battery would be

1st Charge quick rate
2 discharge " "
3 Depreciation
4 High efficiency
5 Space for Co or Opposition
6 Non Corrodible retainers

~~Hahn of Sales Battery at 4 Ampere each 1800 Hours~~

2 1/2 lb for plates without tank.

Cement

Shall require 563 Inc burning
106 not burning 75 Enclosed
are -

Nickel Grid Experiments - [Reg graphite 30 on 50.]

1st 15 on 20 graphite, wet usual way with 20% KOH — 644 — Roff

1½ Same as #1 Except 842

2nd 15 on 20 graphite wet with Water only 644 Roff

3rd 15 on 20 graphite wet with 20 KOH, Very muddy — 644.

3½ Same as 3 but 15% Sod Ammonia ground stuff put by finger — moistened by hand. 2 drops [illegible] it —

4th 50 on 80 — graphite — wet in usual way with 20% KOH 644 Roff

5 ~~3~~50 on 80 graphite wet with Water only 644 Roff

Asbestos Nickel

6th ~~[illegible]~~ — 30 on 50 — wet regular KOH, 644 but the Nickel ground Coarse 4-To pass 100 mesh Roff

7th Same as 6th but nickel ground a long time + made exceedingly fine — Roff

8th Same as 7th but KOH solution very muddy Roff

2nd 13 Lbs good

9th = 30 on 50 graphite 5% KOH made up of 20% ground finer desired mixture — 644

10th = 30 on 50 graphite 2% KOH, fine ground nickel mixed with graphite + enough solution put in to make it much so it can be stirred & then dried over gentle heat till Edison 30 when you are ready to make the mixture 644

11 = 30 on 50 grade 644 - wet the graphite first with 20% — solution only was enough to just dampen the graphite & cause it to cake together between fingers, then add finely ground nickel & stir it only dont roll —

12 = Same as 11 but rolled

13 - 30 on 50 — solution of gum tragacanth — 5% KOH, 644 nickel ground fine + mixed to paste + dried - Tragacanth stick like glue

14 30 on 50 – 6.4 = ~~[illegible]~~ work up by finger in Water the Nickel mass 10% Solution of Ammonia in Water – when this pulp put in grafitti gradually working lumps out with finger & finally get it stiff & can dry it –

---

15 16 on 20 – 7.3. mixed regular 2nd Batch ni moist 20% K.O.H, Rolled

---

16. 30 on 50 – 7.3. mixed reg way 2nd Batch ni moist 20% K.O.H, Rolled

---

17 50 on 80 – 7.3. mixed reg way 2nd Batch ni moist 20% K.O.H Rolled

---

No 18 Peroxide 1st lot made by aylsworth & marked 501 – ~~[illegible]~~ chlorid in bottle liquid – etc – Brown hard, metallic like dust – attracts powder like my 1326 lot – No 18 in 6 ~~[illegible]~~ 4 grs 30 on 50 20% KOH Rolled
Rolled

No 19 Same as 18 Aylsworth No 1 –
Cut of nickel & graphite – Rolled

No 20 Same as 18 – 6 & 4 – wet very
muchy with KOH, then are dried
& the decomposition just sight & then
Rolled – The idea is to get nickel
swelled up before it goes in grid so it
will not swell afterwards.

No 21 #2 Aylsworth ground very
fine 30 on 50 graphite 6 & 4 moist
20% K.O.H. [illegible]
#117

#22 #2 Aylsworth ground very fine
30 on 50 graphite boiled in 20% K.O.H.
for one hour. then washed and dryed
6 & 4 moist 20% potash
#118

#23 Refin # 14 Same 30 on 50 graphite
Refined 8 & 2 moist 20% K.O.H.
Reg way rolled
#119

#120 #24 Rofn #15 30 on 50 plumbago refined
8+2 moist K.O.H. reg rolled

#121 #25 Rofn #16. 30 on 50 plumbago refined
6+4 moist 20% K.O.H. rolled reg

#122 #26 Rofn from 7A 30 on 50 plumbago refined
6+4 moist 20% K.O.H. reg rolled

#123 27 Rofn from #7A 30 on 50 plumbago refined
7+3 moist 20% K.O.H. reg rolled
97/100.

#124 28 Aylsworth #3 N. 30 on 50 plumbago refined
6+4 moist 20 K.O.H. reg rolled

#125 29 Aylsworth #4 N. 30 on 50 plumbago refined
6+4 moist 20% K.O.H. reg rolled

#126 30 Aylsworth #5 30 on 50 plumbago refined
6+4 moist 20% K.O.H. reg rolled

#31 Sylvester H 6 30 on 50 flake graphite refined
6 + 4 moist 20% KO_2H_2 reg rolled
#1/27

#32 Raphi Ni #17 30 on 50 graphite refined
6 + 4 moist 20% KO_2H_2 reg rolled
#1/28

33 = 2nd 13 lb Lot. 6 + 4 30 on 50 20% KOH
Rolled but 1/2 the graphite used to roll
the other half put in & mixed so it
was covered with the black oxide by
rolling but act as a Conductor —
powdered fine —
#1/29

No 34 2nd 13 lb Lot 6 + 4 30 on 50 20% KOH
powdered fine & heated to 212 for
for an hour — 4.72 117/1000
#1/32-1/30

No 35 Raphi 18 30 on 50 graphite refined
8 + 2 moist 20% KO_2H_2 reg rolled
#1/31

No 36 Ni by magnesia 30 on 50 graphite refin
6 + 4 moist 20% KO_2H_2 reg rolled
5 lb bad lot not Chloridinated
#1/33

change 2 at 150 not
[illegible] & same as below

Chg 300 –
[illegible]
[illegible] at 300 at first
1 at 300 on 2nd
1 at 150 on 2nd

982-983 477 aylesworth # 43 Fe 2.28 graphite
moist K.O.H. 200 rolled [illegible]
6.5g 108/1000

984-985 478 Rosin 75 Fe moist K.O.H.
rolled
6.9 108/1000

986-987 479 Cadmium 8g. 2.28 graphite 2.g.
rolled
6.6g 103/1000

988-989 480 Rosin # 75 Fe Nickel plated
graphite 2.g Fe. 8g.
6.8 102/1000

990-991 481 Copper oxide 8.g 2.28 graphite
2g rog rolled moist K.O.H.
7.9 99/1000

992-993 482 Rosin 75 4 offices –
Fe only dry pressed 100 atmos
mixed in grid 100 atmos
5.5g 113/1000

2 of these –

996 483 75 Rofn – Fe only – [illegible] pressure
two atmospheres – funed 150 atmos – Dry press
30 kept first one at 300 second
" " 150 " 5.5 g 108/1000

997 484 Rofn 75 Fe moist KOH.
7 g Fe 2 g graphite 1.9 Carbonate
ammonia 6.7 g 113/1000
dryed on heater

998 485 Rofn 75 Fe pressed dry
then wet gently with H_2O &
left for 2 hours 5.5 g 112/1000
to heat

1000 486 Rofn 75 Fe 8 parts Fe 2 parts
Carbonate ammonia pressed
dry
6 g 129/1000

999 487 aylesworth #49 Fe dry pressed
put in Vacuum 5.5 g 100/1000

1001/1000

488 aylesworth #46 Fe 228 graphite
moist K.O.H. 20g rolled 8 & 2
2 of this 6.2 103/1000

1003/1004

489 aylesworth Fe 49 Dry pressed
7.g 121/1000

1005/1006

490 aylesworth #49 Fe 228 graphite
moist K.O.H. 20g rolled 8 & 2
6.5.g 100/1000

1007/1008

491 aylesworth #53 Fe Dry pressed
Coke 150 } atm
Grid 225 } atm 8.5.g 107/1000

1009/1010

492 aylesworth #54 Fe dry pressed
Coke 150 } atm
Grid 225 } atm 2 of this 7.g 115/1000

1011/1012

493 aylesworth 54 Fe 228 graphite
moist K.O.H. 20% 20g rolled 8 & 2
56 coke } atm
100 grid } atm
2 of this 6.3.g 103/1000

1013
1014

494 aylesworth #61 Fe Dry pressed

Coke 100
Grid 150 } atm

5.g

105/1000

1015
1016

495 aylesworth #62 Fe Dry pressed

Coke 100
Grid 150 } atm

5.g

110/1000

1017
1018

496 aylesworth #63 Fe Dry pressed

Coke 100
Grid. 150 } atm

5.39

111/1000

1019
1020

497 aylesworth #65 Fe Dry pressed

Coke 100
Grid 150 } atm

7.g

108/1000

1021
1022

498 aylesworth #66 Fe dry pressed

Coke 100
Grid 150 } atm

5.g

104/1000

1023

499 aylesworth #67 Fe dry pressed

Coke 100
Grid. 150 } atm

5.5 g

113/1000

1024 X 500 aylesworth #68 Fe dry pressed

Cake 100 } atm
Grid 150 } atm 2.2 g 61/1000

1025 1026 501 aylesworth #64 Fe dry pressed

Cake 100 atm
Grid 150 atm 5.9 g 110/108/1000

1027 502 No1 Edison 72C Roofn Dry pressed – no graf
wet with water by spraying but
worked bad & no wet uneven
5.5.g Cake 100 – Cake wet before grid
111/1000 tunel 150 in grid – got very hot
Dried 2 hours – 220 pm water

1028 503 No2 Edison 72.C Roofn – Dry pressed no graf
wet with brush very wet so it crumbled
little not hot probably due to heat
so much water can't get in
dried 2 hours – wet at 220. 5.5.g
109/1000

1029 504 No3 Edison – 72C Roofn Dry pressed no graf
wet with 2 brushfuls H2O each side, Hot
after few minutes, wet at 220.
5.5 g 113/1000

1030 505 No 4 72 C Rafin Dry process no grab
wet 2 boards full including along side Farmers Subject
wet-d 220 - got hot - 5.5g 113/1000

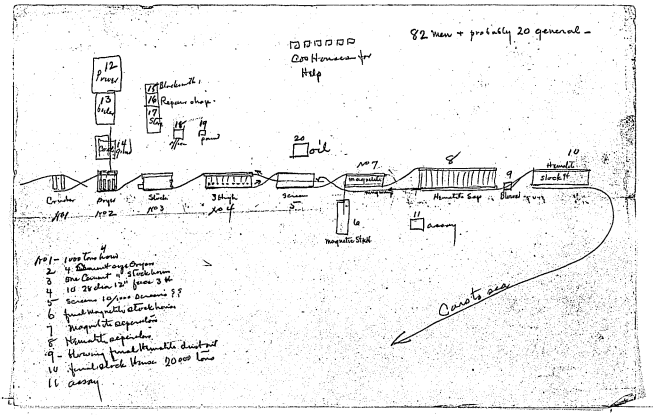
1031 1032 506 aylesworth # 69 Fe dry pressed
Coke 100
Grid 150 7.g 109/1000

1033 507 72 C Rafin - Dry process no grab
100 pressure put in Cup 150 press
dipped in distilled water 6
Seconds — dried all night
5.5g 109/1000

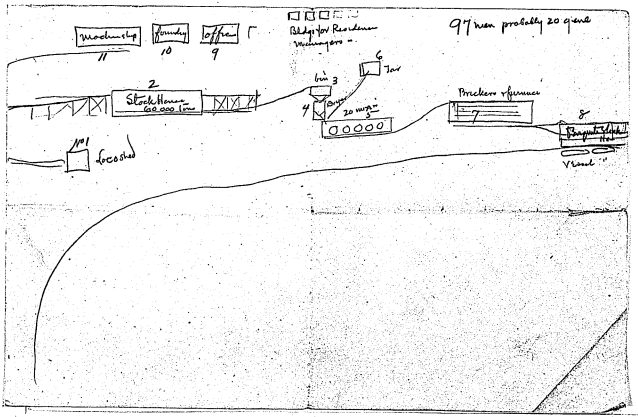
1034 508. 72 C Rafin Dry process no grab
100 press put in Cup 150 press
dipped in distilled water
one minute. Dried all night -
5.5g 111/1000

1035 1036 509 aylesworth # 70 Fe dry pressed
Coke 100
Grid 150 5.g 109/1000

[ITEM FOUND IN BOOK]



[ITEM FOUND IN BOOK]



[ITEM FOUND IN BOOK]

Fred Ott =

Did you make the beam to jar the cell and how does it work & test, Keep me posted about it = Send Curves of tests & amount stuff coming out, I am anxious about this test

E

[ITEM FOUND IN BOOK]

Friday Oct –

go ahead & use lot No 75 of
Rafno Iron – I want to drop
nickels now & go on experimenting
with Iron in little grids –

No 1 = No 75 Iron – 8 parts graphite
2 parts wet with water & mixed by
10 passes through Rolls

No 2 Same with 80 passes
through Rolls

No 3 Same with 60 passes
through Rolls –

No 4 ~~[illegible]~~ No 75 Rafno Iron
~~[illegible]~~ 8 & 2 graphite wet with
50% ammonia water & mixed by
60 passes through Rolls –

[ITEM FOUND IN BOOK]

No 5 No 75 Rafn Iron wet with 20% KOH 60 passes through rolls

No 6 No 75 Rafn Iron wet with Water 8 Iron 2 graphite passing through 40 on 60 mesh 60 passes through mixing Rolls

No 7 – No 75 Rafn Iron 7 parts Iron 2 parts graphite 1 part Electrolyser plumbago – water 60 passes through mixing Rolls

No 8 – No 75 Rafn Iron, pass the mass through the Crushing Rolls till it is flaked up hard, then grind this down finely till the about 50 mesh – then 842 ~~[illegible]~~ Roll on glass all way

[ITEM FOUND IN BOOK]

	Velo	Vspec	Mach	Cab 64	Cone after	
1 No 4 –	100	117	427	101	133	50 on 50 20% Kott 6+4 Rolled
" 2nd Run	107	123	337	101	133	
	86	104	417			
No 5 –	92	107	417	105	143	50 on 50 wet written only rolled 6+4
	105	123	405	105	154	
	87	102	415			
No 6	105	124	367	98	120	30 on 50 20% Koh – 6+4
	100	123	337	98	130	ground Coarse pass 100 mesh Roll –
	84	118	245			
	76	104	357			
No 7	83	113	410	101	122	Same as 6 but ground fine
	109	123	330	101	132	long time Roll
No 8	97	114	392	99	124	Same as 7 but Kott using mixing
	102	121	390	99	128	
No 9	83	104	377	103	132	30 on 50 5% Koh ground fine
	97	115	347	103	139	wet mixing 2nd batch no
						6+4

[ITEM FOUND IN BOOK]

No 10	89	104	280	97	125	30 on 50 2% KOH from ground ni mixed graft & roots def put in make thoroughly stirred Dried Sieve plate 6+4
	84	103	345	"	131	
No 11	86	114	367	103	143	30 on 50 6+4 wet graf 1st with 20% just to dampen the graf & C mass & C like lozenges then add finely ground ni stir only don't roll
	88	106	342	103	149	
No 12	107	123	350	100	133	same as 11 but rolled
	91	112	422	"	135	
No 13	88	106	340	105	137	30 on 50 Sol bromosuccin. 5% KOH 6+4 ni ground fine starts at Ti graf 6+4 =
	100	115	327			
No 14	86	102	372	109	155	30 on 50 6+4 wet by finger in mortar and 15% sal ammon work dry air dry
	90	105	350	109	164	
No 15	108	122	222	105	111	16 on 20 7+3 mixed reg 20% — Rolled
	94	112	322	"	113	
	86	105	365			
No 16	105	120	327	97	128	30 on 50 7+3 mixed reg 20% KOH — rolled
	90	103	322	97	130	
	84	104	450			

[ITEM FOUND IN BOOK]

No 17	94	108	325	95	122	50 on 50 74-3 mixed reg 20%
	86	98	317	95	123	Koh rolled
	83	105	350	95	121	
No 18	77	100	312	95	114	Peroxide 1st cyclonette
	94	110	342	95	138	6+4 30 on 50 20% Koh Rolled
No 19	83	102	397	100	122	cyclonette No 1 74-3 rolled
	86	103	397	100	153	
No 20	106	122	200	100	124	Same as 18 6+4 wet mixed Koh 20% air Dried Rolled Idea got in swelled up before passing
No 21 - cyclonette	87	103	467	100	147	
4	78	103	432	100	157	No 2 cyclonette ground very fine 30 on 50 grind 6+4 20% Koh Reg rolled
No 22	108	120	162	96		
	83	99	335	"	146	No 2 cyclonette very fine 30 on 50 boiled in 20% Koh 4 or 5 hours then washed & dried 6+4 mixed 20% Koh -
~~No 23~~						
No 28	80	98	297	102	143	
No 29	94	111	287	105	150	cyclonette No 3 30 on 50 refined grind 6+4 20% K rolled -
No 30	103	119	280	98	139	cyclonette 4 30 on 50 refined
No 31	92	108	227	94	135	grind 6+4 20% K Rol
No 33	90	108	327	101	142	Acetic cyclonette 5
34	88	103	325	117	117	" " 6
						30 on 50 6+4 20% K rolled Cut
						Y.G. (rolled) 20% K mixed
						30 on 50 ground 4 hours 212

Notebook, N-01-04-17

This undated notebook was probably used in late April 1901. The book contains notes, primarily by Edison, regarding tests of various alloys for use in thermocouples (see also N-01-04-15, N-01-04-16, and N-01-04-19). Among the metals involved are antimony, arsenic, bismuth, lead, nickel, tin, and zinc. At the beginning of the book are entries by an unidentified experimenter. One page of notes by Edison has been inserted into the book. The spine is stamped "16[1]." The pages are unnumbered. Approximately 85 pages have been used.

XE-172

N-(01-04-17)

S.B 87 Broke six times and
Z.N 13 Caked the seventh time

S.B 70 Broke three times Caked the
Z.N 30 fourth.

S.B 62 Broke 3 caked the
Z.N 38 fourth

S.B 61 Broke would not cake
Z.N 39

S.B 60 Broke twice caked third
Z.N 40 time

S.B 20
C.N 80 Would not Cake

S.B 10
C.N 90 Could not get heat enough

S.B 50
S 50 Would not cake

All Sulfshur's are very brittle

S.b 75
Am.P 25 would not melt but burn

All Am.P burns

S.b
a.s Would not melt but caught fire.

S.b
a.l Could not get heat enough

S.b
h.a All are very brittle

S.b
c. Cannot get heat enough

S.b
h.i Cannot get heat enough.

S.b Cannot get heat enough.
Ferromanganese

S.b
m.f Will not melt but burn.

Sb
Tungsten. Cannot get heat enough.

Sb
F.C. Cannot get heat enough

Sb
CuS. Will not take below
Sb70 + CuS30

Sb
SnS Will not take below
Sb70 + SnS30

Sb
Sb_2S_2 Will not take below
Sb35 + $Sb_2S_2$65

Sb
PbS Does not mix well

Sb
PbS Will not take below
Sb50 PbS50

Sb.
CdS. does not mix well

Sb
CdS Cad floats on Sb70
CdS 30

Sb
CdS Cad will not melt below
Sb70 CdS 30

Sb 75
NiS25 Will not cake

Sb 80
NiS 20 Would not cake

Sb75
CoS25 Will not cake

Sb80
CoS 20 Would not cake

Sb does not mix well
NaWo
Sb55
NaWo45 Will not Cake

Sb Mg_2	does not mix at all
Sb Mn_2S	does not melt stays in powder form.
Sb FeS	Will not melt stays in powder form
Sb K_2	Would not mix or cake
Sb KWO	Would not cake below 75 Sb + KWO 25
Sb $BaMnO_4$	Tried 4 different ways and would not melt or cake
Sb WP_2	Will not cake or melt
Sb Hg_2S	Would not cake below Sb 30 + Hg_2S 70

Sb 60 Would not cake whole
(Zn+Sn 95+5) 40 broke three times

Sb 65
Zn+Sn 45-55 35 Would not cake broke

Tried Arsenic on all different metals Tried each metal ~~three~~ with 95 as + 75 as but could not get over 5g in certain metals.

alloy Zn+Bi 5 95 (Sb) All are very brittle most would not cake whole

alloy Zn+Bi 5+95 (Sb) Had to make some twice before they would cake.

Alloy of Cd 95 Bi 5 Cd does not melt but burn had to make some twice

Alloy of 90 Zinc & 10 of Tin —

Alloy Zinc 90 Tin 10		
	95	antimony 5
	90	" 10
	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

(1)

John

Tell the boy who is making alloys that after he has made all the alloys he can from the Sulphides + phosphides to go on Zinc.

Thus —

Zinc	Tin
95	5
90	10
85	15
80	20
75	25
70	30
65	35
60	40
55	45
50	50
45	55
40	60
35	65
30	70
25	75
20	80
15	85
10	90
5	95

~~Zinc — Tin~~

Alloy of Zinc 85 Tin 15 —

Alloy Zinc 85 Tin 15	95	Antimony 5
"	90	" 10
"	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy of Zinc 80 Tin 20 –

Alloy Zn 80 Tin 20	95	Antimony 5
"	90	10
	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy of Zinc 75 Tin 25

Alloy Zinc 75 Tin 25	95	Antimony 5
"	90	10
	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy Zinc 70 Tin 30

Alloy Zinc 70 Tin 30.

95	Antimony 5
90	10
85	15
80	20
75	25
70	30
65	35
60	40
55	45
50	50
45	55
40	60
35	65
30	70
25	75
20	80
15	85
10	90
5	95

Alloy 65 Zinc 35 Tin

Alloy Zinc 65 Tin 35

95	Antimony	5
90	"	10
85		15
80		20
75		25
70		30
65		35
60		40
55		45
50		50
45		55
40		60
35		65
30		70
25		75
20		80
15		85
10		90
5		95

Alloy Zinc 60 Tin 40 –

Alloy Zinc 60 Tin 40	95	Antimony	5
"	90	"	10
"	85		15
	80		20
	75		25
	70		30
	65		35
	60		40
	55		45
	50		50
	45		55
	40		60
	35		65
	30		70
	25		75
	20		80
	15		85
	10		90
	5		95

Alloy Zinc 55 Tin 45.

Alloy Zinc 55 Tin 45	95 antimony	5
"	90	10
	85	15
"	80	20
"	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy Zinc 50 Tin 50.

Alloy Zinc 50 Tin 50	95	Antimony 5
"	90	10
"	85	15
"	80	20
"	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy Zinc 45 Tin 55

Alloy Zinc 45 Tin 55

95	Antimony	5
90		10
85		15
80		20
75		25
70		30
65		35
60		40
55		45
50		50
45		55
40		60
35		65
30		70
25		75
20		80
15		85
10		90
5		95

Alloy Zinc 40 Tin 60

Alloy Zinc 40 Tin 60		Antimony
	95	5
"	90	10
"	85	15
"	80	20
"	75	25
"	70	30
"	65	35
"	60	40
"	55	45
"	50	50
"	45	55
"	40	60
"	35	65
"	30	70
"	25	75
"	20	80
"	15	85
"	10	90
"	5	95

Zinc 35 Tin 65

alloy Zinc 35 Tin 65	95 Antimony	5
"	90	10
"	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy Zinc 30 Tin 70 -

Alloy Zinc 30 Tin 70	95 Containing	5
"	90	10
"	85	15
	80	20
	75	25
	70	30
	65	35
	60	40
	55	45
	50	50
	45	55
	40	60
	35	65
	30	70
	25	75
	20	80
	15	85
	10	90
	5	95

Alloy 3 Zn Sn | 95 Sb 5
25 75 | 90 " 10

85 — 15
80 — 20
75 — 25
70 — 30
65 — 35
60 — 40
55 — 45
50 — 50
45 — 55
40 — 60
35 — 65
30 — 70
25 — 75
20 — 80
15 — 85
10 — 90
5 — 95

alloy

Zinc 20 - Tin 80 — 95 antimony 5

90 " 10

85 — 15

80 — 20

75 — 25

70 — 30

65 — 35

60 — 40

55 — 45

50 — 50

45 — 55

40 — 60

35 — 65

30 — 70

25 — 75

20 — 80

15 — 85

10 — 90

5 — 95

Alloy Zinc 15 Tin 85 — 95 antimony 5

90	10
85	15
80	20
75	25
70	30
65	35
60	40
55	45
50	50
45	55
40	60
35	65
30	70
25	75
20	80
15	85
10	90
5	95

Zn 10 Sn 90

Zn 5 Sn 95

~~Alloy Zn 5 Arsenic 95 — Antimony~~

Alloy Zn 5 arsenic 95

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

X

Alloy
Zn 10 arsenic 90

5	antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

X

Alloy
Zn 15
arsenic 85

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

alloy
Zn 20
arsenic 80

5	containing 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zn 25
arsenic 75

5	antimony	95
10		90
15		85
20		80
25		75
30		70
35		65
40		60
45		55
50		50
55		45
60		40
65		35
70		30
75		25
80		20
85		15
90		10
95		5

alloy
Zn 30
arsenic 70

5	antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 35
Arsenic 65

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 40
Arsenic 60

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Zinc 45
Arsenic 55

5 antimony	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 50
Arsenic 50

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Zinc 55
arsenic 45

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 60
Arsenic 40

5 Antimony	95
10 "	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

alloy
Zinc 65
Arsenic 35

5 Antimony	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 70
Arsenic 30

5 Antimony	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 75
arsenic 25

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 80
Arsenic 20

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 85
arsenic 15

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 90
Arsenic 10

5 Antimony	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 95
Arsenic 5

5	Antimony 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

X

Neev

Alloy
Zinc 5
Bismuth 95

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 10
Bismuth 90

	Sb
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Collong
Zinc 15
Bismuth 85

5 Sb	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 20
Bismuth 80

5 lb	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 25
Bismuth 75

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Celloy

Zinc 30

Brannith 70

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 35
Bismuth 65

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy

Zinc 40
Bismuth 60

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 45
Bismuth 55

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 50
Bismuth 50

	Sb
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 55
Bismuth 45

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy Zinc 5 Jan 95

95	Antimony 5
90	10
85	15
80	20
75	25
70	30
65	35
60	40
55	45
50	50
45	55
40	60
35	65
30	70
25	75
20	80
15	85
10	90
5	95

Alloy Zinc 10 Tin 90

95	Antimony 5
90	10
85	15
80	20
75	25
70	30
65	35
60	40
55	45
50	50
45	55
40	60
35	65
30	70
25	75
20	80
15	85
10	90
5	95

Alloy
Zinc 60
Bismuth 40

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy

Zinc 65
Bismuth 35

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 70
Bismuth 30

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

11

Alloy

Zinc 75
Bismuth 25

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy
Zinc 80
Bismuth 20

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy

Zinc 85
Bismuth 15

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy.
Zinc 90
Bismuth 10

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Alloy

Zinc 95	5 Sb 95
Bismuth 5	10 — 90
	15 — 85
	20 — 80
	25 — 75
	30 — 70
	35 — 65
	40 — 60
	45 — 55
	50 — 50
	55 — 45
	60 — 40
	65 — 35
	70 — 30
	75 — 25
	80 — 20
	85 — 15
	90 — 10
	95 — 5

Tin 5 — Bismuth 95

	Sta
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 10
Bromth 90

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun	Sb
15	95
Bismuth 85 — 5	
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 20
Bromwith 80

5	56	95
10		90
15		85
20		80
25		75
30		70
35		65
40		60
45		55
50		50
55		45
60		40
65		35
70		30
75		25
80		20
85		15
90		10
95		5

Jan 25 } 5 86 95
Bismarck 75 } 10 — 90
15 — 85
20 — 80
25 — 75
30 — 70
35 — 65
40 — 60
45 — 55
50 — 50
55 — 45
60 — 40
65 — 35
70 — 30
75 — 25
80 — 20
85 — 15
90 — 10
95 — 5

Jun 30
Bismuth 70

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 35
Bennett 65

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Tin 40
Bismuth 60

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 45
Bennett 55

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jan 50
Bennett 50

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jm 55
Bromuth 45

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 60
Bismuth 40

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Tin 65 | 5 — 56 95

Bismuth 35 | 10 — 90
15 — 85
20 — 80
25 — 75
30 — 70
35 — 65
40 — 60
45 — 55
50 — 50
55 — 45
60 — 40
65 — 35
70 — 30
75 — 25
80 — 20
85 — 15
90 — 10
95 — 5

Tin 70
Bismuth 30

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jim 75
Bromuth 25

5 56 95
10 90
15 85
20 80
25 75
30 70
35 65
40 60
45 55
50 50
55 45
60 40
65 35
70 30
75 25
80 20
85 15
90 10
95 5

Jin 80

Bromeith 20

5	56	95
10		90
15		85
20		80
25		75
30		70
35		65
40		60
45		55
50		50
55		45
60		40
65		35
70		30
75		25
80		20
85		15
90		10
95		5

Tin 85
Bismuth 15

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 90 / 10 Bismuth

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Jun 95 } 5 — 56 95
Barnett 5 }

10 — 90
15 — 85
20 — 80
25 — 75
30 — 70
35 — 65
40 — 60
45 — 55
50 — 50
55 — 45
60 — 40
65 — 35
70 — 30
75 — 25
80 — 20
85 — 15
90 — 10
95 — 5

Lead 95
Bismuth 5

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Lead 90
Bismuth 10

5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

head 85
Bromwich 15

5	56 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Lead 80
Bismuth 20

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Lead 75
Bismuth 25

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Lead 70	5	Sb	95
Bismuth 30	10		90
	15		85
	20		80
	25		75
	30		70
	35		65
	40		60
	45		55
	50		50
	55		45
	60		40
	65		35
	70		30
	75		25
	80		20
	85		15
	90		10
	95		5

Lead 65

Bismuth 35

5	Sb 95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Lead 60
Bismuth 40

5 — 95
10 — 90
15 — 85
20 — 80
25 — 75
30 — 70
35 — 65
40 — 60
45 — 55
50 — 50
55 — 45
60 — 40
65 — 35
70 — 30
75 — 25
80 — 20
85 — 15
90 — 10
95 — 5

Lead 55
Bismuth 45 } 5 Sb 95

Running 5 per cent

Lead 50
Bismuth 50 } 5 Sb 95 ✓

Run by 5 percent

Lead 45
Bismuth 55 } 5 Sb 95 ✓

Run by 5 percent

Lead 40
Bismuth 60 } 5 Sb 95 ✓

Run by 5 percent

Lead 35
Bismuth 65 } 5 Sb 95 ✓

Run by 5 percent

Lead 30
Bismuth 70 } 5 Sb 95 ✓
Rem by 5 pect

Lead 25
Bismuth 75 } 5 Sb 95 ✓
ditto

Lead 20
Bismuth 80 } 5 Sb 95 ✓
ditto

Lead 15
Bismuth 85 } 5 Sb 95 ✓
ditto

Lead 10
Bismuth 90 } 5 Sb 95 ✓
ditto

Lead 5
Bismuth 95 } 5 Sb 95 ✓
ditto

Cadmium 5
Bismuth 95 } 5 5b 95
Run the whole by 5 percent.

Cad 10
Bi 90

Cad 15
Bi 85

Cad 20
Bi 80

Cad 25
Bi 75

Cad 30
Bi 70

Cad 35
Bi 65

Cad 40
Bi 60

Cad 45
Bi 55

Cad 50
Bi 50

Cad 55
Bi 45

Cad 60
Bi 40

Cad 65
Bi 35

Cad 70
Bi 30

Cad 75
Bi 25

Cad 80
Bi 20

Cad 85
Bi 15

Cad 90
Bi 10

Cad 95
Bi 5

Run all with 56 5 per cent steps

"

"

"

"

Selgemm

~~Selgemm~~ 5	Autumn 95
" 10	" 90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Zinc X
Cadmium X

Alloy		Furnace Stick
Cadmium 99	Selenium 1	~~[illegible]~~ 5.50 Cooling 4.50
98	2	
97	3	
96	4	
95	5	
94	6	
93	7	
92	8	
91	9	
90	10	
89	11	
88	12	
87	13	
86	14	
85	15	
84	16	
83	17	
82	18	
81	19	
80	20	

X

Small stick

Cadmium 99	Tellurium 1	5.50 Antimony 4.50.
98	2	
97	3	
96	4	
95	5	
94	6	
93	7	
92	8	
91	9	
90	10	
89	11	
88	12	
87	13	
86	14	
85	15	
84	16	
83	17	
82	18	
81	19	
80	20	

Quarell sticks

Tellurium	Autumn
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Quail chick

Tellurium	Zinc
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

Tellurium	Cadmium
5	95
10	90
15	85
20	80
25	75
30	70
35	65
40	60
45	55
50	50
55	45
60	40
65	35
70	30
75	25
80	20
85	15
90	10
95	5

[ITEM FOUND IN BOOK]

alloy

Cadmium 99	Bismuth 1	55	aulmy	45
" 98	" 2	55	"	45
97	" 3	"		
96	4	"		
95	5			
94	6			
93	7			
92	8			
91	9			
90	10			
89	11			
88	12			
87	13			
86	14			
85	15			
84	16			
83	17			
82	18			
81	19			
80	20			

Notebook, N-01-05-10

This notebook covers the period May-June 1901. All entries are by Edison. The book contains notes and drawings relating to the development of Edison's alkaline storage battery. Included are preliminary sketches for a manufacturing plant, notes regarding the production of nickel suitable for use in the battery, and a list of experimental techniques for packing the nickel into the cell grids. The front cover is marked "May 01." The pages are unnumbered, and several pages have been removed from the book. Approximately 60 pages have been used.

100 lbs. 480 gals.

4800 gals 10 times — 24 hours 20

5 — for 100 lbs. 1

25 " 500 lbs 2

50 —
25 —
12
6
3
12

3
4 —
5
6
7
8
9
10
11 1
1'

30
30
904
360
900
1728) 1296 (7.
1200

56) 480 (8.
.3918
.183 20

09
043

25 —
5000
25,000

72
72
144
504
900) 5184 (6 —

25 —

13
52 —

2 —

150 000) 1500000 (10 lb
1500000
100 lb

3
500
30
5000

100 —

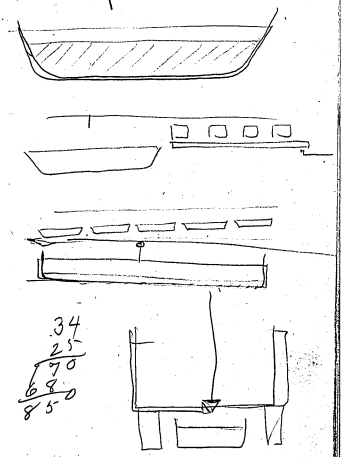
100
2 lb

2 — 1 lb —
2½
500

500 lb

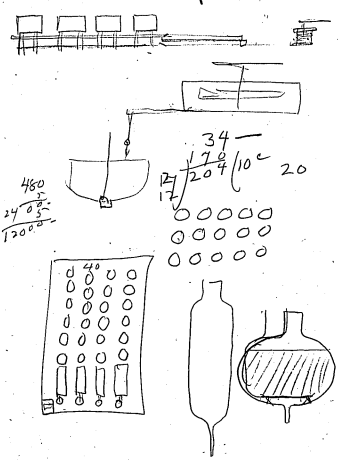
8

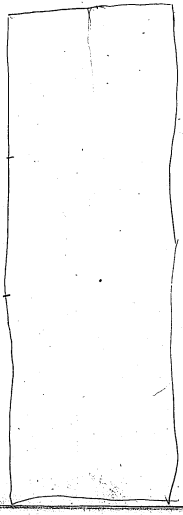
May 10 1901



34
25
70
68
85-0

May 10 1901



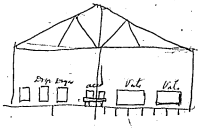


50 | 180 (18 cents lb

500 | 5000

4

1000 –



45 c lb

6 72

355

360 | 4200 (14

1000 | 4000

500

210 –

350

210 –

140 | 210 –

355

350

60

210

24

500

1500

May 10 1901

300 lbs Sweet 50

12 | 3000

6000 –

250

50

50 x 200

50 x 100 250

50 x 3100 $\frac{12}{250}$

300

23

3000 –

21

4200

8400

8 | 300

60

1

50 x 400

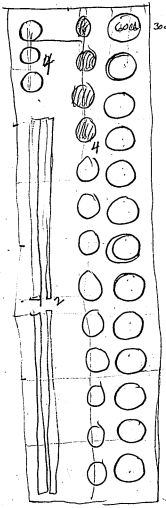
18000

140 | 3000 (21

2800

200

500 lbs | by 60



4

2

2

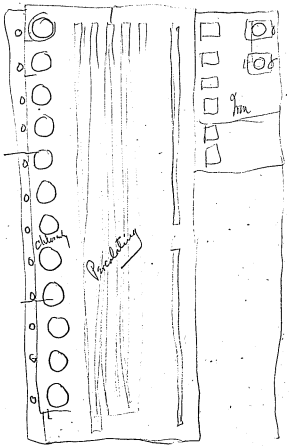
2

2

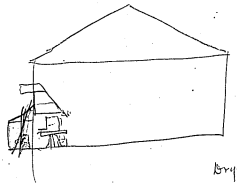
50

29

12 Cells



May 10 1901

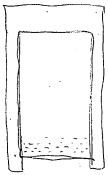


Bldgs	10000
Foundtn	1000
Steam heat	Edison
Vats	1000
Chly tank	1000
" Tank	500
Lightness	500
Recally Steam	250
	14650
	10000
	$24950

Dryers	300
Kettles	1000
Dryers plates press bags	3500
Iron	10000
Roasts	300
Vats	500
Etc	1000
pump	1500
Well	10100

Edison

May 10 1901



24
9
168
18
1008
168
2688
2304
3840
3840
20

460) 1.58

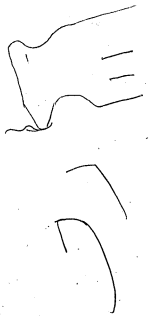
4.8
45
240
192
21.60

2.16 cents per cell

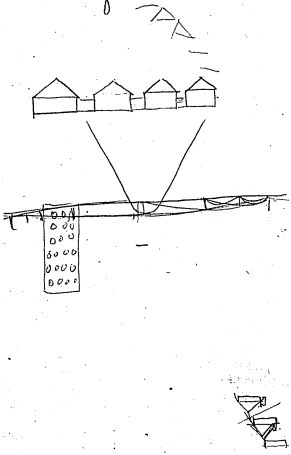
10 | 4.4

2.16
44
864
864
95.04

9.50 cHpH
4
8800



maggio 1901



May 24th 1901 —

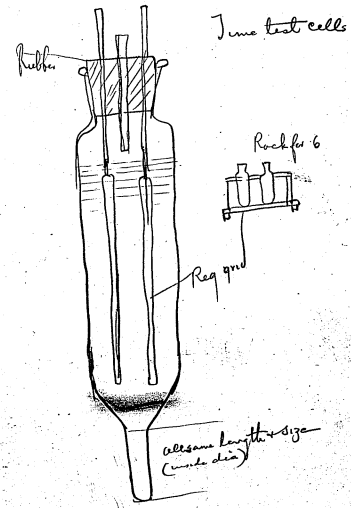
So far the experiments on making Ni O hydroxide shows that all the published processes produce in solution of the hydroxide basic salts of the acid Rad of the Ni Salt used — and there is the greatest difficulty in making the pure hydroxide — so far Nitrate Ni is purified by passing H_2S. then boiled & filtered, then treated for 2 days with Carb Barium — After filtration the Soluble Barium Carb is precipitated by H_2SO_4 — Solution allowed slowly decanted & filtered, This solution is heated while boiling to KOH free from Carbonate by BaOH & boiled with excess KOH — Washed by decantation it settles well except — per 6 "

May 24 1901

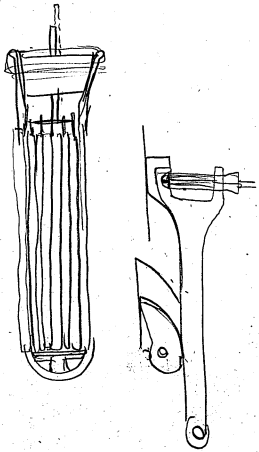
decantation then slowly - a few drops ammonia Causes it to settle OK —

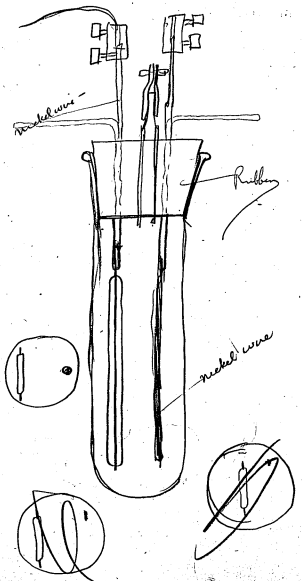
The other way is to take the Ni Nit boil + then to another solution boiling containing precipitated Mg OH from the Nitrate by KOH - The Ni Nit is added to the proper amount leaving an excess of Mg OH - To prevent basic salts of Ni forming ~~although~~ washed by decantation & then fully Chlorinated to turn it to Ni_2O_3 - the Mg OH turning to Mg hypochlorite which dissolves

May 24. 1901


June test cells
Rubber
Rack for 6
Reg grid
all same length + size
(inside dia)

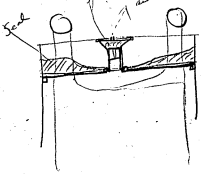
May 24 1901

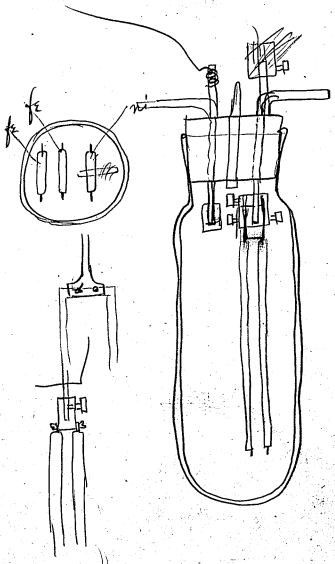


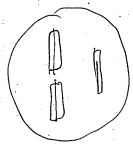


24 May 1901

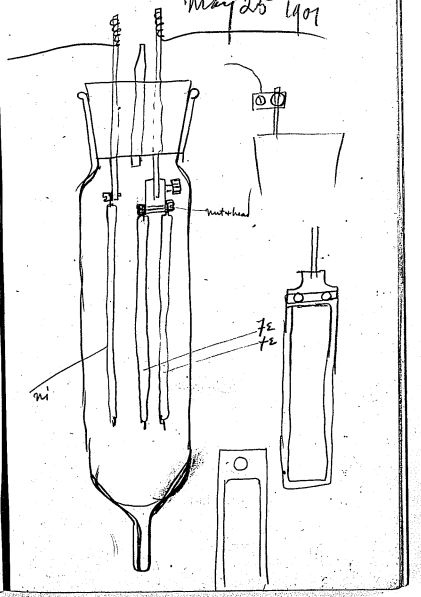
Propose to close cell keep out CO_2 by a rubber valve — also by a sponge wet with KOH or BaOH —







May 25 1907



May 25 1907

Reduce Ni from oxalate, nitrate, etc by hydrogen then pass —

One lot, Vapor phos —
2nd " PH
3rd " NH_3
4th " Arsthydgn —
5th " Co Nickel kept at heat to form Ni Carbonyl then cool down + pass Co for

Dwl hour

dittto same but after Co pass washed H for

Dwl hours —

22) 162 (73
154
8

William Fallon

43) 280 (6.5
258
220
215

35) 224 (64
210
140
14

13) 68 (5.2
65
3

22) 132 (6
132

28) 168 (6
168

16) 90 (5.6
80
10

50) 168 (3.36
150
18

19) 112 (5.8
95
170
152

June 1 1901 XX series

Experiments to determine best way to pack nickel & iron oxides in grid from 12 lb hot ~~Sodium~~ green

1st: Limit pressure of die so edges are thrown over ok but pressure may be varied down to ~~5 atmos~~ what is equal to 5 at on gauge but 75 atmos on Turning cup over on grid – all the pressure necessary is to force burrs into brick & spread it. The overall will then be very little as it will take place internally =

2nd Make large grid or several small ones & charge fully then break take out which & gently dry & make 2 grids regular way see if holds charge & cycles again

3 = powder Ni & then polish grains with Photografer-pbgo, only polish them, then ~~[illegible]~~ add water + roll -

4 = Have Acheson purify some of large cut graphite we can find say 5 mesh. try 2 grids in this + 2 with 50% big 50% 30 or 50 - mixed.

5th = try a good Rafer Fe with 8+2 7+3 6+4 5+5

6 ditto Ni with 6+4 5+5 4+6 graf 3 ni 7 graf 2 ni 8 gm to get a Curve

7 Silver plate by Cyanide some
30 m. 50 purified graphite use 6 & 4
H_2O & Roll –

8 Ditto Nickel plate purified
graphite, lightly 6 & 4 H_2O + Roll

9 Try some magnesium powder
with Ni 6 & 4 – H_2O + Roll –

10 = Make reg Ni brick & moist outside
& stick large graphite on also
moist inside cup & do same
then press –

5000 - 30000 / 3000 / 60 milgms

11 = Make Ni brick with 10/1000 pieces wet + pressed as brick no graphite –

12 = Attack the surface of purified graf with Concentrated Nitric – or boiling $KClo_3$ + H_2SO_4 until get a dull surface – then make reg Ni 6+4 H_2O + roll –

13 = 7+3 Ni Ni worked to pulp in water + 1 part yellow ox Hg worked in after it is dried somewhat then H_2O + Roll –

14 = 6+3 Ni Reg with 60 milgms oxide Silver worked in –

15 6+3 Ni Reg with 1 part precipitated Copper Ox wkd in

---

16. 6+3 Ni with 1 gram Magnetite worked in better very fine ground

17 Briquette pressed Edgewise so graphite flakes will reach across + not flat,

18 - Reg Ni - 5% KOH Cp closed 10% 15% 20% 25% 30 35 + 40% —

19 - Same with CP Sodium —

20 Same Lithia —

21 - Same BaOH Saturated

22 " Strontia OH "

23 = Aylsworth Make a CP Cobalt Hydroxide Wk req -

24 = Make briquette solid Ni OH + use big graphite on outside + edges + plenty in Cups.

25 Make Ni bricks + then use 2 slabs of graphite same size as brick 005 thick put one Each side + press req way

26 = Dehydrate NiOH in Open at 150 212 + 250 — also in Closed tube 150 212 + 250

27 Dehydrate Ni in Boiling Glycerin

28 " in Chloride Zinc

29 " " " Calcium -

~~KOH~~

~~30 " " Cu~~

30 " " Castor oil &
afterwards boil out oil in weak
KOH - & wash -

31 Raffn run Curves on Ox Ni
from Oxalate - to get best
results from H_2O -

32 Ni oxalate heated to oxide then
reduce H, then put in grid
reg & oxidize in Strong $NaCO_3$
to peroxidize then wash in
water & put in reg KOH,

33 = ~~graphite~~ Nickel plated on graphite, packed in grid & oxidized in Conc CO_3Na - by Ct

34 = See if a better oxidizer, by Carnot than $NaCO_3$ Cannot be found for oxidg metallic Ni to Ni_2O_3 or higher Try - $KClO_3$ slow $KClO_3$ in KOH

35 Try Chlorate of Nickel see what works -

36 Reg Ni 644 but Acheasons non flake graphite used

37 = Acheasons porous non flaky Graphite Soaked in Conc Nit Ni & precip by Soda in pores - washed, then dried & pressed in briquettes.

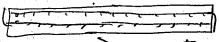
38 Make a lot of Ni_2O_3 by acting on green in bottom cell by current, Ni disk electrode KOH - Wash + put in grid Reg way - use granulated not pulp -

39 = Try ignited good conducting Lampblock with Ni + Reg 6 + 4 Ni -

40 = Lay a perforated piece in center of briquette with Ni Reg

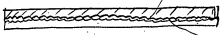
41 Lay a perforated piece in center of brick with one end a little long so it comes up at one end of Cup - will make Contact with Cup when pressed in grid -

42 Same as 41 but 2 pieces -



This will insure good Contact,

43 -



Make brick in 2 parts with 2 pieces inside this will let KOH in & Res will be 1/2 it will work ok when pressed in Cup or brick sides is ok for the Cup burrs entering -

44 Try Acheson flake graphite with Hi -

45 - Have Cyfromith purify some Ceylongraf -

46 get some Electrolyte + put in ~~[illegible]~~
KOH solution make aluminum pour
in Nit Nickel ones to precip
together —

---

47 make 1/2 dozen 003 cups of
nickel & test 12 lb green hot
in —

---

48 Roll some Steel to 1/1000 + make
some Cups ~~[illegible]~~ Nickel plate
thin & test with Reg —

---

49 = Purify some KOH free acid
radicals or Halogens + test
in closed cell.

50 - Reg big lot when mushy & before drying thorough ~~mix~~ mix the graphite in right proportions & dry & roll before dead dry -

51 - See if its possible to Commercially make an amine which is an alkali to replace KOH - see Myers - book -

No 1 XX

52 Solder 10 joints & place in KOH make a Post & neg & spark both - put date on. Arrange a line in Case to put time tests on so they not be disturbed

June 2nd 1901

53 - Put a good Fe reducing in time test line with oxdzg

54 = Try very thin $\frac{1}{4}$/1000 nom scale to mix with powdered Fe - also try with Ni - no graphite - also some reduced by H ? ?.

55 also try rolling out magnesium powder to a scale -

56 - Try Copper scale very thin instead of graphite, to mix with Fe + also Ni - also very thin reduced in H ? ? -

57 = precip Ni sulphide see of Cornuché if so try it in grid if it dont oxidize up or reduce Mix with Ni -

58 = Try if can form a sulphide scale on sheet nickel & see if it is not too brittle, so can use it for mixing —

59 = Make very thin Fe scale reduced by H by Rufus best Cinnr & use it alone in grid —

60 anneal a file & see how it works —

61 - Ask Walling to get from Bethlehem a pound or 2 of nickel steel, or from Shelby a piece of Ni steel best quality —

62 = Try in grid to absorb O
Sulphate Ba, O Palate Lime
Phos Magnesia rather insoluble
Salts —

63 = Make grid Barium Chromate
6 graft 4 - use Iron
+ Saturated Solution of
Barium Hydroxide -

64 = Bismuth Hydroxide made
by KOH + BiCl - to oxdize +
test for deplyn -

65 = Titanium powder Dettain -
to 1st deox then see Ct then
ox + use Fe -

66 Molybdenum
ditto as with 65 -

[JUNE 7, 1901?]

May 7 1901

67 Iron red by H 800 - from Oxalate - Fe treated partially by perox hydrogen - air dried - 842

68 = Iron from oxalate red by Hydrogen 800 - acted on by Hypo - washed - air dried 842
1st 1277 2nd 1282 - 3rd 1137

69 = Iron from Oxalate reduced with H 800 - acted on by boiling along KOH washed air dried 842
1st 1380 2nd 1070 - 3rd 910 -

70 - Aylesworth Big lot Cp -
dried then put in KOH
& Bromine added turns to
Olive reddish - 6 & 4 -

71 = Oxal Fe reduced by H
gas - acted on 2 hours
H_2O_2 only formed little
Oxl acid very slight amount
then little more H_2O_2
it then swelled greatly
Washed only fair - 1st 350 2nd 332
8 & 2
oxdyes to red on air but
slowly -

72 Oxnl Fe reduced by H
then put in Water with
very little KOH + per
ox hydgn added it kept
black after about 2
hours added very
little H_2SO_4 + H_2O_2
it Browned rapidly +
swelled to twice bulk
settles beautifully +
resembles ~~[illegible]~~ Ox from
FeS by oxdg with Current
its Chocolate Color wet
8+2

73 = Ferrous Sulphate
treated with paraffin
Hydrogen in excess – soon
throws down a precipitate
(washed well –
842

74 = Ott No 140 is Blue Cupric
hydroxide – made quite
oxidized by Cummins it showed
Very poor ? scarcely anything

75 = 9s Oxalate Fe ignited & reduced at Red to Metallic iron — Treated with a little peroxide Hydrogen — considerably more than 76 which is only 20 or 30 drops to 6 or 8 grammes

842 = just off dead black

632 mah

76 = Same as 75 but very little peroxide Hydrogen used — 842 — no brown but dead black

1232 mah 1st

77 = 9s same as 75 but treated with a large quantity perox & turns brown —

842 = 285 mah

78 = Nickel reduced by H or it is
Oxalate heated in air till it
got black Refu not oxidized
Then was black when I got it
Been treating it for 3 days,
in alcohol bath with Hypo
644 — no nitting at all

79 — 67 gwa — 6 parts powdered
fuse, then 4 graminis photo
Ammonia 30 shaken in Gallic
then rolled dry — Then 1.5 grms
flake graf 30 or 50 Reg. then
mixed & rolled dry — it completely
covers green NiO & takes dry
This makes 6 NiO 4 graphite —

1st 302 wet Dry 32 —

80 — Iron from Oxalate reduced to metal by Hydrogen treated with 2 inches in test tube of Hypo & 4 times as much water, in liquid 20 hours — 8 & 2

81 — Same as 80 with weak Stronger Solution ~~of~~ Hypo — 8 & 2

82 Same as 80 with very strong Solution Hypo 8 & 2

83. No 67 Nickel gros - 6 parts graphite through 8 mesher on 12 mesh not purified #20 - Mowat Rolled -

84 = This is Rifine Iron reduced by Hydrogen at good red heat, treated many times with Hypo on steam table 30 hours - its gray + no tint of Brown its bulk has considerably increased it phoned do Geller Chem No 80 3rd one which gave 1950 Wash -

88 = No 67, put in Reg 6 & 4 then dipped in strong ammonia + soaked as long as no color comes out

85 Nickel reduced by H at red heat - ~~[illegible]~~ HCl - little while say 1/2 hour then Hypo 12 hours - ng -

86 - Nickel reduced not quite red heat 1st lot, No HCl - Hypo 30 hours - ng

87 Nickel Red heat by H Chlorate K + HCl - 1/2 hour then washed, then Hypo all night - ng

Hoppler No 1

		Flow
Crude	65.17 72	.014
Conc	67.66 -	010

Hoppler No 2

Crude	38.61	.414
Conc	56 48	.191

Hoppler No 3

Crude	35 38	.240
Conc	61 45	.090

Osborne Mer

Crude	25 70	.337
Conc	58 35	.268 -

89 Salad MO_2H_2 No 67, no graftite - H_2O wet! 1st 115 2nd 149 - (Scull 149)

90 - 6 parts No 67 gra -
1 part powdered ~~Bi~~ carbonate Soda
3 parts graphite, H_2O -

91 = No 67 gra ground very fine and dehydrated at 212 for 1 hour in water bath
644 1st 557 - 2nd 600

92 No 67 gra 644 - This grid wt to 62 given to Roofer.
to nickel plate over the cobalt

93— No 67 gwa— 6 parts
3 parts grafite + one part
Carbonate ammonia — mix
dry ——— heat w steam
~~bath~~ y. hour ——
1st 400 2nd 632

94— No 67 gwa 6 parts
3 parts grafite ~~two~~ parts
Camphor— Roll— wet with
Water, 1st 330— 2nd 525

95 = No 67 gwa 5 parts
3 parts grafite 2 parts
Camphor — wet with water
+ Roll —

June 26 1901

96 6 parts Sulphate of Lead 4 parts graphite — Zinc Electrode

~~97 [illegible]~~

Both put in plain water with 3% of Sulphate of Zinc ~~[illegible]~~ ~~[illegible]~~ discharged ← charged several times —

98 = 6 parts precipitated Peroxide of Manganese (W & Home sons) 4 parts graphite —

This put into a 20 per Cent Solution of Chloride of Ammonium with a Zinc Electrode — and discharged ← Recharged —

99 — 6 parts Chloride Silver 4 graphite use in 3 per cent solution of Chloride of Zinc — Use Zinc El.

June 20, 1901

100 — 6 phosphate Lead 4 graphite —
101 — ditto —

Both affiche and to be put in solution of 5% of phosphoric acid — at charge and discharge
100 Positive & 101 neg —

102 6 grams Borate Lead 4 graphite
Make 2 grids both put in
5% solution of Boric acid in water — Pos Neg —

103 6 grams Tungstate Lead (obtained by precipitation) 4 graphite —
Make two electrodes put in
Solution of 10% metatungstic acid —
Charge & discharge

104 6 parts finely powdered
Native peroxide Manganese
Pyrolusite good quality from
Selected lumps finely powdered
4 parts graphite —
~~[illegible]~~ strong solution
Chloride Ammonia 20% —
discharge + then recharge

---

103 — ~~6~~ 70 gms - 6+4 use water
after putting on grid bake for hour
on steam bath to get water out

104 Duplicate of 103

105 65B gwa 6+4 ground very fine
+ rolled ~~a~~ recalled 5 or 6, times more
than usual use ~~Dabz~~ water
than usual to start with.

106 Dup of 105

107 – 65B gwa 6+4 ground very fine,
then put in water + floated, ~~that~~
stuff not floated is ground + so
on until the whale is float,
raff a great deal —

108 Dup of 107

113. bottom jar has white sediment
this shows Carb NH not all driven
off —

109 – 65 B gw a 6 & 4 – Done in the regular way + to 62 run in 40% KOH + treated in 40% KOH — Be one + treat the Cays about the 40%

110 Dup of 109

111 – 65 B gw a 6 & 4 done in the regular way

112 Dup of 114 ——

113 – 8 of Nickel 2 of graphite
2 parts Carbonate Ammonia –
Bake grid on steam bath 1/2 hr.
good swell locus – parts 51% – to 93 on 118 gm
Swell 180

114 Dup of 113 —
not so good swell swell – 129
3rd Run –

✓ 115. 6 nickel 3 graphite. 1 Carbonate.
ammonia heat grid on steam bath
½ hour —

✓ 116 - Dup. of 115 —

✓ 117 - 6 of Zinc dust 4 graphite —
to be put in a saturated
solution of Aluminate of
Potash - with a charged
Nickel Electrode & discharged.

---

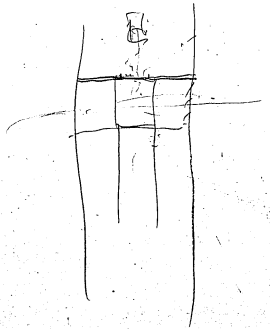
118 - partially dried Nickel
Hydrate, 8 parts Nickel
4 parts graphite no water.
Roll well stiff too wet
let rolled stiff dry a
little till its ok —

119 Mercurous sulphate 6 parts
4 parts graphite water

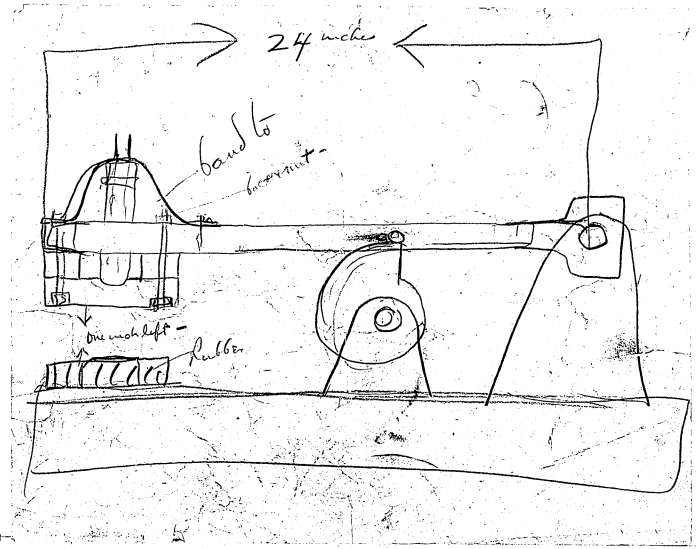
120 Duplicate of 119

121 6 parts mangan. sesq hydrate by treating suspended Carbonate with Chlorine
4 parts graphite

122 Cu.O by roasting Carbonate at red heat
(Reporting Manager Pofford)
Cu.O 6 parts graphite 4 parts



[ITEM FOUND IN BOOK]



Notebook, N-01-05-06

This notebook was used during June 1901. All entries are by Edison. Most of the book contains notes and drawings regarding the development of Edison's alkaline storage battery. Included are experiments using Edison-Lalande primary cells. There are also drawings pertaining to experiments with sound amplification for the phonograph using compressed air and other techniques. The front cover is marked "June 1901." The pages are unnumbered. Approximately 50 pages have been used.

Athenaeum

June 4 1901

70 = ~~Sorbit~~ float some req
Dropons 30 on 50, & use only the
very heavy — for a Ni.

71 = Act on Cupric hydroxide
with peroxide hydrogen green
Color changed to yellow.
perox Copper CuO_2 H_2O — Lelande
tried Ag —

tried Mg 72 = a higher form of CuOx
than CuO_2 is obtained by
heating a mixture of KOH, $NaNO_3$, & metallic
Cop to red heat. Lelande
— by soaking Cuo KNO_3 in a Reg Carbonplatin
ignite —

73 = Is Oxychloride Copper
Soluable in alkali (c) KOH of
not test as deplyr Lelande -
possibly it may not dissolve in BaOH.
See if Oxychloride Magnesia works

74 Make a 6+4 precip Oxide
Mercury rolled - 30 on 50 -

75 - Make a Cadmium Metal 743
test against Ni for Volts +
Capacity -

76 - Make Spongy Copper 743
+ run it against Ni -

77 = precip from Nitrates to give an Equal molecular quantity of Ni + Cu Hydroxides - 6+4 oxidize + get Curve with Iron

78 precip from Nitrates to give Equal Molecular quantity Ni + Magnesium Hydroxides -

79 = Ditto Ni + Ba

80 = Ditto, Cu + Ba 6+4

81 " Cu + Mg Run Curves

82 " Cu + Fe

83 " Cu Sb Idea is to make a double Salt

84 " Cu + Sn OX

85 = Molybdate Copper, Hydrated.
86 " Nickel "
87 " Iron
88 — Tin
89 — Zinc —
90 — antimony
91 Fluoride Copper
92 — Nickel
93 — Iron
94 — Tin
95 — Zinc
96 — Antimony

97 = Cobalt finely divided
absorbs H like palladium use
it 6 & 4 in alkalim. using
H as the Oxalate Method

98 = Ferricyanide of Zinc Copper or Mercury are powerful oxidizers when in alkaline solution

They oxidize aniline salts to aniline black

There may be other ferricyanides made in alkali that hold the extra O very loosely -

Try. Cd, Bi Co Cu

Fe ferrous - Mn Hg(ous) Ni

Tin(ous) Zn

Have tried above & find that

Either Ferri or Ferro

is sol in KOH making the reaction impossible

Possibly all ferrocyanides are sol in alkali, also ammonia

99 Treat ferricy K with K chlorate + HCl – The salt formed is a new kind of permanganate – it a very energetic oxidizer – it gives insoluble precips with most salts, try these as depolarizers – try Fe Mn Zn Cu Bi Sb? Pb Tin Hg Cd Buy some

100 Manganicyanides acts similar to ferricy – NG

101 Chromicyanides NG

102 There is little doubt now ~~that~~ the oxide scale on Zinc in Leclanche is due to Carbonates in Soda used – Make test of Leclanche with NaOH having Carb removed by BaOH & see if Zinc doesn't keep bright — try amalgam also + Volts —

June 6. 1901

103 Try Bicarbonate Potash as Electrolyte + MnO_2 for depolarizer with Mn Fe, Zn, Cu Cd Sb Pb Sn - Hydrates in grid 6 to 4 graphite -

104 Try in BiCarb K. Electrolyte, Perox Pb as depolr with Mn Fe Zn Cd Sn Pb Cd -

Mayle 1901

105 Ferrous Oxide or Hydrate does not form a Carbonate hence an Electrolyte of Carb or Bi Carb K could be used with Iron & MnO_2 Can be used

106 Try Oxidizing Monosulphate iron by ~~[illegible]~~ Hypo Na see if oxide Fe produced is reducable in grid by Ct dont get Excess Hypo - just suff Oxidize it

Job also

107 Precip Ferric hydroxide & boil with reducing agents see if BX is reducable by Ct

2 amps

31.16
28.91
2.25.

0.66
NiOx

3576
2891
6.25

2.13.

59
1.16
45
1.60 (4.00
3.20
1.48
1.32
1.60
1.48
2.6.25) 21.30 (34
18.75
2.550
2.500

2891

26

59
16
75 (1.60 (2.33
1.30
1.40
1.40
NiO2 2.55
2.33
NO2 0.33

59
32
91 (3.70
2.730
47.5
45.5
1.90
1.90
0

3576 (

NiO to Ni 2000 mg
3 | 2000 milliamperhours
666-

108 — Powder up Monosulphide iron very fine & boil in Conc KOH, also fuse some in KOH to ox Sulphur — also try hot NH_3 also ox Silver & dis out aqS by NH_3 —

109 = Try oxdz Iron Reduced by H with; Hypo — also peroxhydrogen perhaps the resultant oxides will be reducable by Ct, Tuesday ~~June 12~~ 1901 TAE

110 — I figure that we have 2 grams Ni in grid, this showed give 2000 milliamperhours NiO to Ni but Ni_2O_2 to Ni_2O_3 only gives 1/3 of this or atmost 670 mah —

111 = It may be that there is a voltage between Fe & Ni or hard iron if so it might possibly be grown of coating grid with Fe which might also in liquid impregnate CO_2 - Charge an iron grid & leave it in KOH solution 3 days & discharge it see if lost much & watch growing ~~when~~ during the 3 days — Used closed bottle CP KOH

~~Nickel~~

112 - Oxidize finely divided Nickel dry sulphide - Monosulphide with H_2O_2 - also H_2O_2 also act on Ni Rich Cu & Hg from oxalate by Iodine & then fused KOH + glycerine -

113 – Cyanide of Nickel turns brown when heated giving off 19 percent of water – H_2O_2 or Hypo or anhydrous KOH & glycerine or dry perox Na ground together might give an anhydrous oxide active in battery –

114 = precip from Ferrous Sul in great excess Fe Cy heavy CyK – dry or dehydrate & then act on it with fused KOH ground together in glycerine

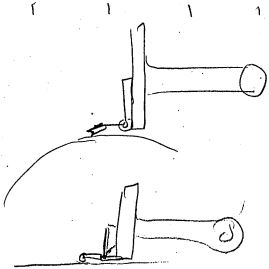
(glycerine was bad June 12 1901 Fe)

[JUNE 6, 1901?]

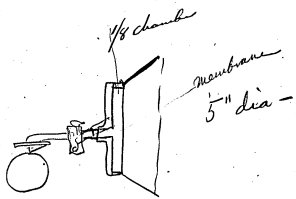
May 6 1901

115 Ethylsulphate of Potassium ~~with Zinc~~ gives at Zinc pole Ethylsulfuric acid & form Ethylate of Zinc with H or K at other pole — or alcoholic Sulphates give free Acid ac & OX try Ethylsulfate as an Electrolite —

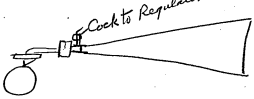
The Alloy Iron & Sodium to get bi dyble Iron



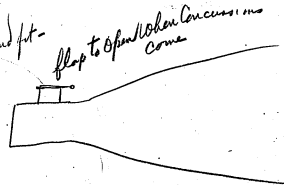
117


1/8 chamber
membrane
5" dia -

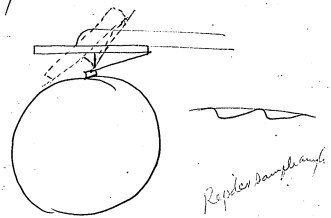
118 -


Cock to Regulate.

119


ground fit -
flap to Open when Concussion comes

120 - good -



121 = Make with new 6g lot CP
Ni - 6+4 rolled longer than
usual -

122 ditto rolled quite mushy to
start with & Keep rolling
till dry enough to press

123 Mix very mushy roll mushy & press briquette by hand & let it dry out then put in & Repress

124 = put some Dixon flake in Crucible & bring to white heat then take out & purify by fusion & HFloric - 1/2 lb

125 = purify Dixon flake by fusion or HFl - then put in Crucible bring to white heat, 1/2 lb -

126 - Mould hot bricks 20/000 thick of Ni heavy pressure, Coat surfaces with 30 or 50 graf - put 5 plates together & repress to briquettes -

127 = plate Cups 1st with Ni then silver - Try a Ni + Fe

128 = Take a nickel plated pour Cups & silver plate them + put in closed cell for time test, CP. KOH, No Carb or Chl -

129 - Ditto steel Cup ~~silver~~ Silver plated only time test like 128.

130 - Time test. 2 steel Cups closed Cell - CP KOH, No Carb or Cl. + with KOH saturated with BaOH

131 - Screen out of 1bl of flake graf the largest flakes that Carb found - purify + try 2 or 3 metals at once -

Done June 12 1901 T.E.

132 Wet some powdered graphite with Chloride platinum, then ignite - Try Ni with it =

133. Try putting in a grid ready for test into a nickelplating solution + plate Ni over whole, then soak in water to get solution out & test regular of DKW —

134: Do the same with Iron grid + test regular -

135= Make regular Ni grid. then dry out + soak in Concentrate Nitrate Nickel for 6 hours put it in KOH, for 6 hours. then in large quantity water then test regular —

from Ox. in tube - not funny 1905

136 - Make Sesquioxide of Ni reduced to bright metal by Hydrogen at low heat possible - act on it by various oxidizing agents to get it active, also by current in Cells K - Bones gum 12 1901 Tue
Dirt & Kiswell -

137 Try precipitating a sulphide of Nickel - then wash well but do not dry - then act on it by Peroxide Hydrogen - also activation part by Hypo, + other oxidizing agts. also by Alkaline Solution say KOH to which is added H_2O_2 This will take care of the Sulphur

138 - Soak Asbestos fibre in Nitrate Silver + reduce by Hydrogen - use for grid -

139 Soak asbestos fibre in Concentrated Nitrate Nickel or reduce by Hydrogen for use in grid - Red hot -

140 Soak starch paste (1) make hot sodium starch jelly with Cond Nitrate or chloride Nickel & reduce in Hydrogen Red

141 = Soak Brass in Nitrate ~~Ni~~ also chloride Nickel & Reduce at Red Heat by Hydrogen

142 dissolve Sulphate Iron & glycerine precip by KOH in glycerine boil - then dilute + wash

143 Same as 142 but dehydrate the Sul Iron except last alone H_2O —

144 - Same as 142 except
Entirely dehydrate the
sulphate -

145 = with big lot Ni - roll along
~~time~~ spread out thin - grind
Ni exceedingly fine -

146 - get some big lot Ni dried
to clay like + roll thin
Exhaustively - 6 + 4 -

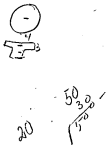
147 Nitro but 4 flake 2
photofro, roll exhaustively

148 = Big lot, use concentrated solution of NiOxide in Ammonia to wet stuff before rolling

149 – Big lot 6 & 4 H_2O rolled after grid in dry out in Chrom bath, then dip in NH_3 as long as no color comes out then put in KOH,

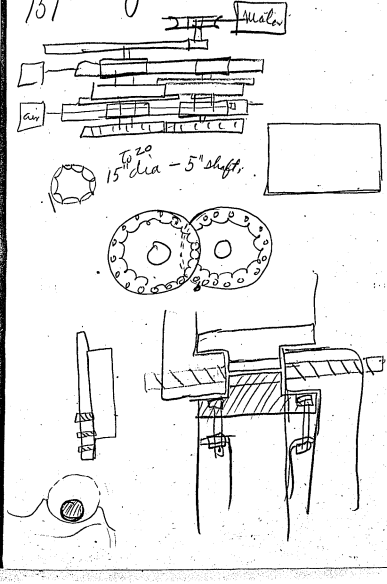
150 – Make Concentrated Solution of NiO in NH_3 + ~~the~~ Oxdyze

N. – has plat wires –



151

June 8 1901 Brinker



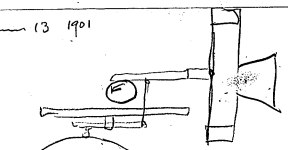
152 = New big lot Ni - powder up fine when dry - then tumble in a small tumbling Can The powder with ~~the~~ phalogopite ~~pts~~ graphite 6 pts Ni to 1 pt graphite, until every particle is Coated then mix it 7 & 3 Roll - H_2O This has common pitume Resistance - Curing June 12 1901 T.E.

153 - Tell Sumpkins about air Cylinder ~~D Knot~~ Dundulana 2 pan rolls

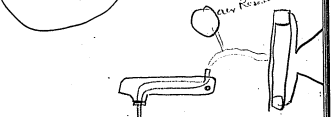
154 = Make Solid NiO no graphite dehydrt 120 Mesh

155. NiO 6 graf 3 powdered Carb soda 1 - dehydrt 10 hours

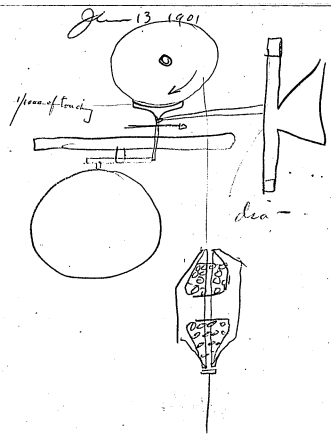
June 13 1901

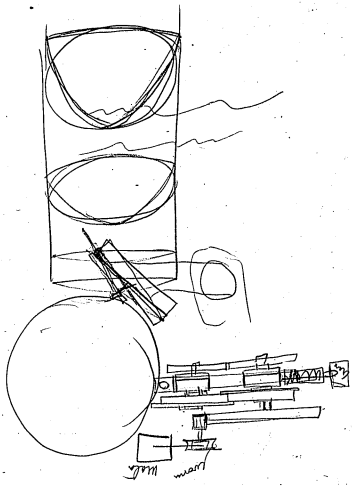


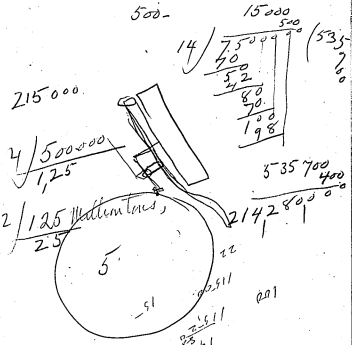
Power Repeater



Power Repeater


13 1901
1/2000 of touch
dia


WALL
WALL


500-
15000
500
14)
75000
70
50
42
80
70
100
198
535
700
215000
4)500000
125
2)125 Million tons,
25
5
2142800
535700
400
0

40000 –

5 / 80000 –

330 / 80000 / 66000 / 14000 (24

60 ft

100 ft min –

12 HP –

10 HP 3 ton

60 / 2000 (330

1800

200

24

3

72

120

60

3.2

2240 / 7200 / 6720

480

4

60

20 –

120

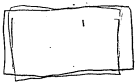
170 / 1728 (10 –

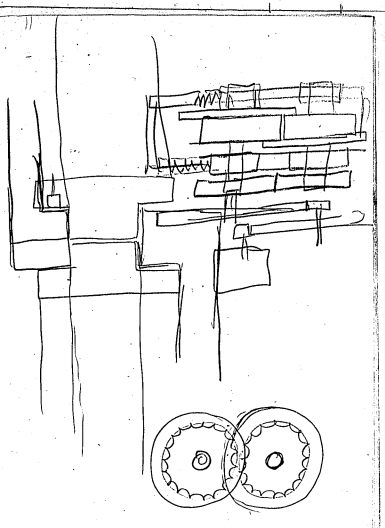
1700

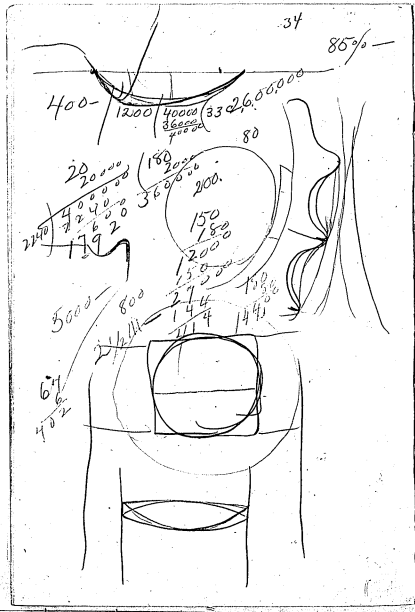
28

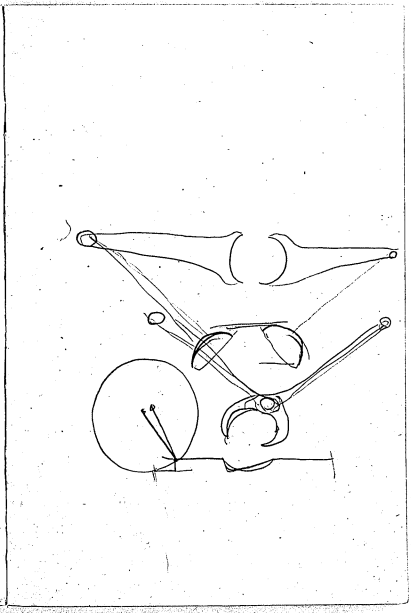
4 tons,

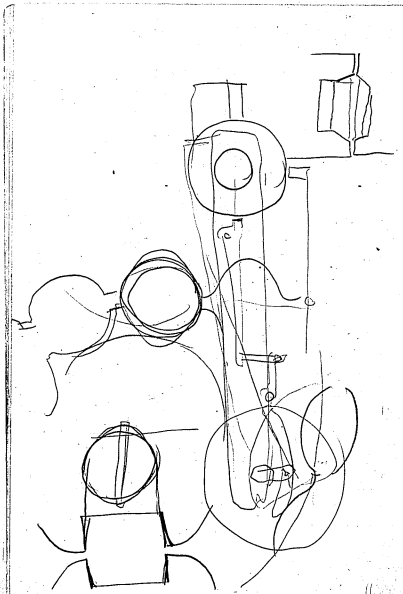
3 tons 12 HP –






34
85%
400
1200
40000
33
260000
80
20
20000
180
200
360000
200
150
120
5000
800
27
144
144
149
64
4
2





1865

2240) 93250000 (4163

5000

8960

3650

22400

14400

13440

6600

837 —

2240

375 —

186

20) 4163 (207

40

163

38

12

76

38

456

26.

2210.

50

500

12

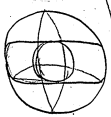
30

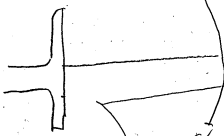
38

24
700
16.8 20
3360

12
24
48
24
28.8
2
57.6
28.8
345.

1200 -



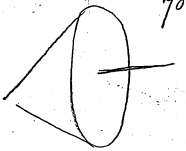


8

4.5 | 60 | 1.33
45
15
13.5
1.50
6
7.98

798.

700 -



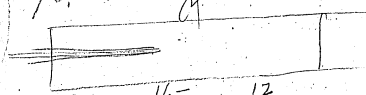
Arrived Guer Pr. 8. 30
Leave Sept. Ballast
3/48
168
20
80

Notebook, N-01-07-01.2

This notebook contains dated entries from July 1901 and February 1903. All entries are by Edison. At the beginning of the book are notes and drawings relating to storage battery experiments. The following entries pertain to thermoelectric battery experiments, the production of electricity directly from coal, and experiments regarding potential unseen forces such as "xyz rays." Included is an idea for generating forces by substituting the iron core of a generator with other material, along with notations about methods for photographically recording these forces. Also included is an entry in which Edison proposes an experiment on the "6th sense," as well as an idea for recording phonograph cylinders by chemical action. Near the end of the book are drawings of what appears to be a cement processing or an ore milling plant and a one-page note for a traveling motion picture exhibition. The pages are unnumbered, and several pages have been removed from the book. Approximately 80 pages have been used.

680
24
2720
1360
16,320

20,000
40



13.

16
8
128

12
16
72

2000
192

25,000
200

40
20
800

1000
200

160

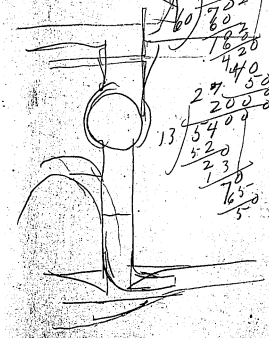
300 lbs

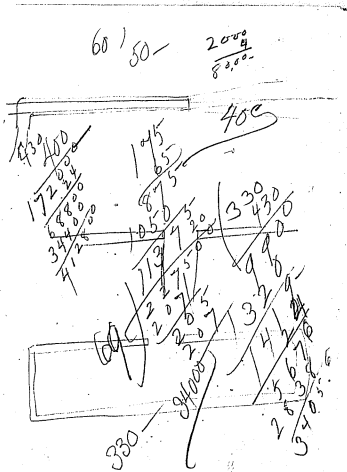
7.5 / 300 (40
225
75

40
200
250
4,500

11700 ft-min

54000
13
162000
54000
702000 (11700
60
90
60
420
420
50
2000
54000
13 / 54000 (4153
52
23
130
65
50





200 = Reduce ferric from oxalate by NH_3 –

201 Reduce ferric from oxalate by CO –

202 Reduce ferric from oxalate by boiling grape sugar or other reducing agents –

203 – 67 or 69 gwa – ~~two~~ nickel grids one new in closed jar – Charge 150 ma density on first charge + over charge then discharge 1 ampere + Recharge 1 ampere – etc + see what it does + get curves Duplicate the Cells in

204
205 use same from that known
206 to be good + give over 1100 Mah

207 } make 69 gwa 6+4 but put
208 } in enough to make 110-caliper
209 }

~~208~~

210 }
211 } 69 gwa 6+4 - enough to make
212 } 120 Caliper -

213 }
214 } 69 gwa 6+4 enough to make
215 } 130 Caliper -

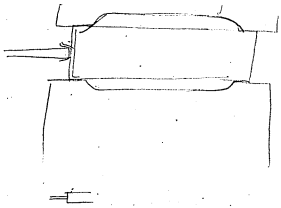
216 }
217 } 69 gwa 6+4 - water, regular
218 } roll + dry out on steam
plate the object is to get
more KOH in -

219
220
221 } 69 Gwa - 6+4 H_2O - but ~~rolled~~ ground very fine + rolled + rerolled a great many times, Examine under Microscope ~~between rollings~~

222
223
224 } 69 Gwa 6+4 - ground fine. H_2O dehydrated 212

225
226
227 } 69 Gwa 6+4 - Dehydrated to dark brown. ~~[illegible]~~ H_2O —

228
229
230. } 69 Gwa 6+4 H_2O Reg rolled but charged + discharged ~~to~~ worked in 40% KOH —



231
232
233

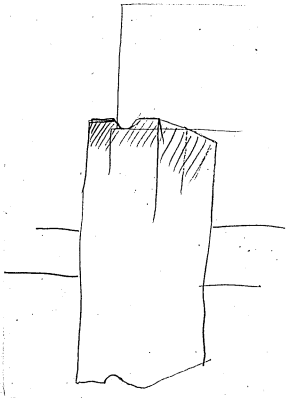
234 = get small grid cupola brick + crump edges in vise study the action alcohol shaved ~~to~~ Changed ~~to~~ make a Geller Crump

235 = try tiny flame on Molten KOH potash Sapphire - No

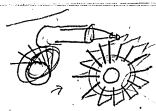
236 - try HFl. action on Sapphire No

237 Make some float sapphire that will stay in suspension in water for 1/2 hour - for polishing sapphire -

238 Dills Carborundum

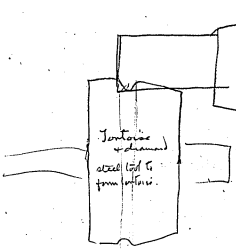


239



240 -

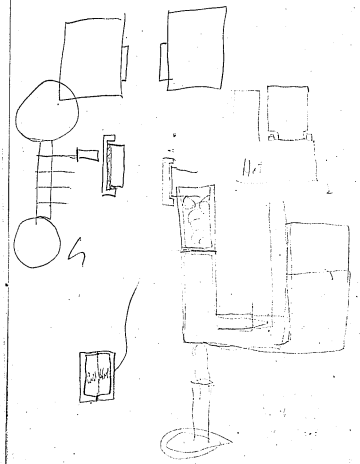
guard to hold cutting edge



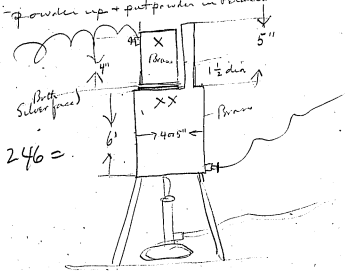
241 } 69 gra. 6 + 4 graphite plated
242 } lightly with Nickel
243 }

244 = Try plating Ni on the bright purified graphite - instead of on Dixons. ditto try silver —

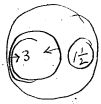
245 = Work up the Carbonate, Ammonia precipitate mixed with Nickel as it seems to give fine results, also the Carb Soda - find other Soluble salts Valuable Compounds - ~~also of~~ BaOH, SrOH, AlOH, ZnOH, MnOH, LiOH, Succinate & Benzoate KOH, Borate, Oleate or Oleic acid



Thermo Experiments H_2O Cold & hot
using anhydrous crystals. Get Hot & Cold Cycle
(Approx. temperature by finger)
also all X ray Crystals, some hydrated Crystals
powder up + put powder in Beaker



246 =



Top

24b Theory is that any of Impalpable Calcium used the heat will always the Crystal to a point when it will reach a certain point — then suddenly Continuous is given a charge like a Leyden jar — + these being thousands of grains, will get a Continuous Current from heat —

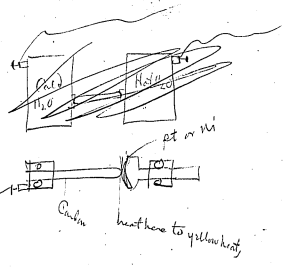
Try Journalme & all phosphorescing Crystals — also all phosphorescent — & Uranium salts, Oxalates

Lithium ite — Cu Ray

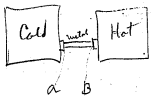
Oxalate Calcium — } Electric by heat.
" " Iron — } " " friction

palmatone. Bletts 80c Hyfley Electric

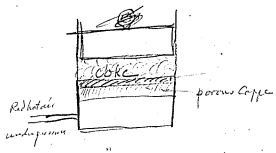
247 =

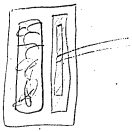


248 = Try thin films of oxides
sulphides phosphides of metals -

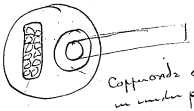


A clean
B oxidized etc
or there is ~~a~~ ~~some~~
some film of oxide etc
on the surface

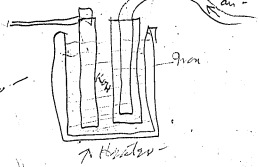




E derived from Coal

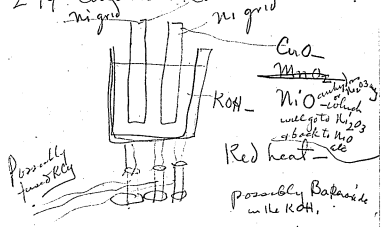


Nickel gas
with Coke packed - KOH solid
Whole jar of Iron heated fuse red
O of air OxCuto CuO + this is
reduced as formed by K of KOH
CO eliminated - small cell
2" dia will do for Experiment



Weight by
Rly also -

249 – Continued Coke



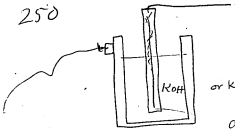
Use sheet Ni instead Iron

Rogers make some cups of Ni also holders –

Make Iron cell Ni plated about 2" dia + higher

Rey humblers –

250



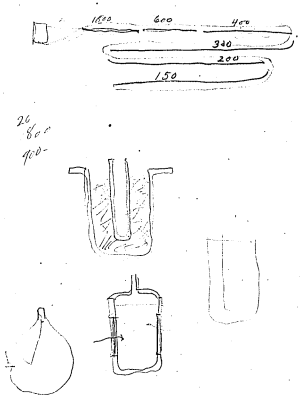
iron pot
KOH,
or KCy also
grid Fe_2O_3 anhydrous

Pot heated red hot

Cryolite $KClO_3$ KCl
Carb Soda

250 – Phosphate of tetramethylammonium is highly alkaline –

251 Magnesium acted on by Hydrogen peroxide forms a strong alkaline liquid



July 1 1901

252 – Try plating zinc from zincate consisting of CP ZnO in CP KOH. having no CO_2 & use Magnesium to plate on – Use closed cell

253, Make a grid of precipted ZnO_2H_2 ~~[illegible]~~ grid being made of Magnesium – 50/1000 thick & use ~~[illegible]~~ 10% Sol CP KOH in which alumina is dissolved to Saturation. Then reduce Zn to Metallic state use Ni Dzplg –

254 ~~[illegible]~~ 1/2
MnO – Aluminate KOH,
Zinc – Thick ~~[illegible]~~
~~[illegible]~~ Mn wont dissolve

Zinc
Ur
Mg
Pb
Bi
Cd
Cr
Co
Cu
same
Mn

254 Peroxide of acetyl – when dry, powerful Explosive, powerful oxidizer & probably good depolarizer – Easily made by dissolving Acetic Anhydride in pure ether & add Equivalent Quantity Perox Barium – See Oxygen Watts Rep Abs Vol 1 p 95

Peroxide Benzoyl OK

The anhydrides of Dibasic acids treated with Peroxide Ba form easily decomposed peroxides, for instance Succinic anhy – See Ox 319 –

255 Oxynaphthalamine, Easily made by dissolving Hydrochlorate of Naphthalamine in alcohol solution diluted but not enough to produce turbidity while whole is stirred add Ferric Chloride drop by drop added until slight excess while allowed stand & now repeatedly stirring

Ox

255 precip then collected & washed until Nit Silver gives no precip in wash water - then washed with Alcohol & dried in Vacuo -

its amorphous light, purple - when more simple like Iodine -

it does not combine with acids or alkalies - insol in KOH

I suppose the Cl from Ferric chl. dec. H_2O & the O oxdzs the H, Naphthalamine, This should be Cheap deptzr. for Leucoids & possibly reversible -

Oxysulphides -
Oxychlorides - deptzrs

256 = Write to somebody in Cuba & Porto Rico about Palm Waxes -

Try oxdgd anthracine, (10) by Nitric with NaOH for phono Cylinder - Oxdg Cheap Hydrocarbons with Nitric & then Wash & Combine with NaOH for putting on Phono Cylinder

Phenoic acid 388 Watts Reg

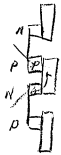
Try anilin residum W. have some

257 Phospham - PHN_2 — decomposed only by fusing with KOH,

258. Chloronitride of Phos

Hypophosphites are interesting with phosphite

259 Ni Salt at 100 decompose gives off H & deposits Metallic Nickel



July 3 1907

260 - Think KOH saturated with Ammonia is going to be a good electrolyte

~~Try Carbon Cathode with graphite & Zn powder~~

261. ~~Ammonia~~

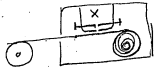
~~Potassium~~

~~Try Aluminum plate~~

261 - decompose acetate Nickel in Vac by heat & absorb the acetic by phos acid or KOH, this may leave Nickel Ox is an active form for battery

Decompose acetate or formate Nickel in Vacuo by heat + absorb the acid by solid reagent, leaving metallic Nickel possibly in a finely divided state that it will be active. in Storage Bat.
Hypophosphite Ni deposits metal at 100 C.

New Recorder idea –



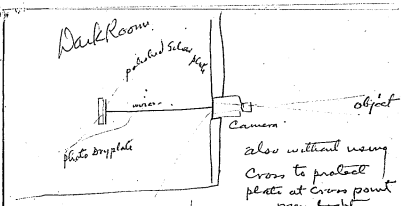
Dark Room

Band paper coated with Balmain Phosphorescent powder – box X containing sparking points, Source of light Vac tube – etc. small opening round hole 1/16 dia close to paper (10) touching – Now dots + dashes recorded by manipulating key + throwing light into box + short waves – all in dark room –
This principle is capable of wide application for galvanometers etc. in Experiment – as the paper can be used over + over, + the record Copied before it dies out,

MM

possibly the proximity of different materials to sparking point will give off emanations or rays invisible even to photography or eye that will control sparking not as Ultra Violet light does — also, Electrified body which is discharged by Radium or X ray could be used in connection with slides. The bottles containing the chemicals of the slides could be used removing some of the material & using off boys to make the test.

In some of the tests with the slides it may be necessary to remove the Mica as it may entirely absorb something that is to come out. This with off boy will not be very difficult Especially for photographing —



Idea being that light may cause transmission of a ray thro plate + Condenser in wire + expand out in 2nd plate + photo of time is given say 10 hours or more –

On the principle of Nernst's lamp it may be a good thermo could be got from a Conducting Sulphide in an atmosphere of Sulphur under pressure thus permitting high temp without decomposition of Sulphide. This will be true of any conducting Compound

and as many compounds become conducting when fused, + those which are prone to decomposition by heat + current will not do so in an atmosphere of the products of their decomposition it opens a wide field for a thermo battery — from semi or molten compounds between proper electrodes, one of which is at higher temperature than the other —

William X ray tube after use for few minutes + disconnected gives off invisible ray to photo plates,

Have Old Guy's break off piece of all Country Rock from samples up in Lab — granite, gneiss etc powders put on slides, also collect from grain at Sound Rock opp photo with all dif kind rock powder & also & and washed make slides — also those rare Alkaloids in leather sample case —

possibly plain glass, celluloid,
Mica, polished hard rubber would
act in place of a dry photo. plate,
the light sensitizing or changing
surface so if put in Vac or exposed in
air or sublimed chemicals adhered
to Come in Contact they would adhere
only where light acted or contra
possibly some liquids might wet
light acted parts or contra,
possibly polished metal plates
might be acted on so vapors
would act differently on dry parts
iodine, Hg - etc —
Metals might be enclosed in a
light shield like dry plate sensitized
+ Use in a vapor of a chemical
+ Camera used producing
a reaction bet polished surface
+ the Vapor — polished metal
plates might be used in place
Dry plate on slides some
dry from chemicals altering
surface possibly have holes Mica
out —

possibly in dark room a polished plate could be made one pole for a silent discharge & Ultra Violet beam thro quartz lenses focus picture on plate of Coil is weak no silent discharg take place except where light strikes hence action of discharg rather polish & we get photo

Will X ray affect a clinical thermometer —

Will X ray affect a very sensitive Hg thermometer & ditto a liquid therm — as therm with H_2O index —

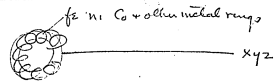
Hydroxylamine seems to be the most powerful reducer possibly dry plates of def things could be made that which not developable by ordinary developers would be by Hydroxylamine ~~Wm~~

possibly all metals are compounds
Except the magnetic metals Fe Ni Co.
& are connected to the Ether, whereas
iron Ni + Co are bare or centra —
is it true that alkali metals in high Vacuo
will give various colored films to
monochromatic light whereas Fe gives
black & possibly Ni + Co better than
films of all metals were & of Fe Co Ni
blacked prove to be the only ones gives
black films it will be of great
scientific fact,

Try depositing the films in mag field
also X ray field — also bulb in
Cod oil — also heated bulb —

If an iron Dynamo gives Elec
what would a Bismuth Dynamo
give — field of Bi + armature
Cons Bi — XYZ? —

If wire is wound on Bismuth closed
ring would be Rick by opposed
to that of iron —

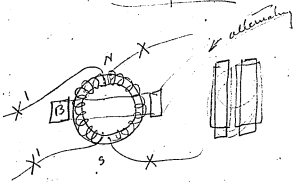


Wound with Coarse wire + powerful alternating Current sent thro —
Think I have one made with iron wire insulated to form core with Cu wire outside the 2 ends of iron core going out + forming metallic Ckt for X y z
There should be something to route the Current (I) make it go one way — possibly wire should be formed of Fe + Cu in lengths so one turn would give a couple + then X y z would be directional

---

I think an Electrolytic Condenser Could be made that would Cancel out one alternation + give rayes that Current, like that Linseed paper Condr but should be of metals + insulated with proper Electrolyte — could discover

proper conditions by immersed electrodes say in KOH solutions would be practicable for low volt alternating —



B Coil with alternations making one part ring N other S,
Ring of steel permanently magnetized strong as possible
is there any way to connect
XX X'X' to get continuous
Current.

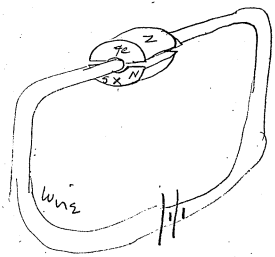
probably if one Current from
the Coil is cancelled out, or a 2000 Volt
battery ~~C~~ used or pures of metals
in Vac tubes used that it will
be found that certain metals
are torn off & deposit ~~by~~ as
films by Current in one direction
while others may be thrown
off only by Current in opposite
direction — Thus Experiment should
be tried as it may turn out
that Fe Ni Co might give films
only from Neg C while all others
give only from P Current, but
it may also turn out that all
metals which in Cell go from
anode to Cathode would form
films only P Current whereas Non
metallic elements would form
films only by Neg Current
this would be a great Experiment.

Selenium Tellurium Crystal block
Sulphur arsenic Iodine possibly
as alloy — for sparking points
in Vacuo —

X Electrode of metal disk coated
entirely by any shellac Rosin
gutta percha etc + make long
so heat in sealing will not
affect it — both metals
same sec phenomenon —
Then make disks of Cu with
CuO on + coated with dif things
like Rosin etc + other metals
Zinc Cd etc also coated,
also not coated —

Substitute iron cores in coils
with Non metallic Elements.
get Kick — also 1/2 a closed
ring with metallic other 1/2
non metallic Element for instance
Fe Cu or Se Ag or Ar Cu
Etc — see phenomena —

As C dis in red hot iron-Zn
also amalgamates, Make hot
iron plates like Condensers
C Fe Zn C Fe Zn Heat to red
out Contact are + see if get
Current, or Fe + C only (1c)
C Fe C Fe C Fe Etc. Separated
or Connected [illegible] + so on
Could pack in ashes and
if Cementation gives Current,



If X in position as so gives N + S take it away + leave Z what polarity will it have If rotating X around it change its polarity then the Etheric lines converge to the Center of Every circuit, — Curious!

A good Commercial generator of Oxyhydrogen gas would be say in Reg cell 50 plates of plated welded Ni steel, in 20% KOH, with large Dry - this would do for Laboratory Theatres Kinetics Etc - very practical device no elaboration - plates 15/1000 or 10/1000 slightly Compact + superimposed - storage battery to work it.

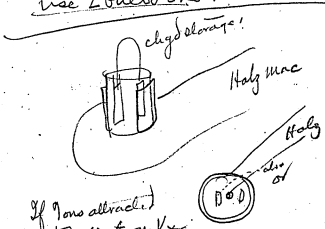
---

possibly two glass plates warm with warm solution of Chemicals between + pressed together so as to leave very thin film - will on cooling Crystalize - before Crystallizing Coated be electrically charged also X ray + mag + ultraviolet light Etc.

also 1/2 of glass with one Chem other half another Chem + progress of reaction watched in electrolyte X + mag + ultra

possibly a glass plate coated
chlag the chlag fused in
atmos of chlorine to glass
+ then coated with gelatin
+ photo taken, this would
give sharper result.
~~Could a reducing agt be used~~

Will phosphorus last
longer in Vac than in
air
use 2 bulbs one Vac



If ions attracted
try effect on V + amp
of electrification

Better put say 50 slides out on table + with arc - try powders in boxes of one of def metals Compounds to get specific light + then try next 50 until all tried for this particular powder + light for fluorescence + phos also thru opaque in fluoroscope box. because some Compounds in arc may send out a ray which go thru opaque paper. Try all slides thru then change to def powder

Feby 13 1903

Try experiments on 6th sense etc

2 persons series with 10 volt battery in series, read writing by one on paper, to be ready by the other,

electric, magnetic current - Ultra violet, one insulated other not -

Vibrated E from Coil - left hand one right of other group - & numerous changes - try several persons

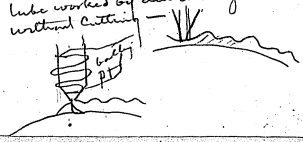
---

possibly a capillary tube of thick film dope could be bz connected to diaphm & the thread of dope run out & soundrecord made by throwing it in waves, or being blown to act surface - also the surface could be flown over & when reach a certain state record made by displacement,

Feby 13 1903

It is possible that film dopa could be used as a base to dissolve other amorphous substances in as acetate amyl is good solvent for organic materials & a compound got that would be just the thing for cutting records — Camphor, Metacinnamene, Resins, ~~Aluminate~~ Stearate Aluminum Oleate Aluminum & ditto Stearate & Oleate Mag — Waxes, Soaps, etc, Chloral Hydrate,

Possably a Capillary tube of molten wax kept warm by plate with steam and when wax starts Cylinder & Capillary tube worked by disc would give record without cutting —



add to last of film materials
peas soap ~~dipped in alc~~
by dipping plate in hot
alcohol & soap film thin
or can burn —
paper in hot Linseed at
certain stage changes to
Elastic — at least Gamboge
fels did —

Birch bark —
Lace wood —
Certain Seaweeds
Tracing Cloth —
Sulphide Moly Edenum —
Rind of the Cactus.

Ent

825
24
330
1650
1980

198
24
792
396
154

162
129

32
16
192
384
768

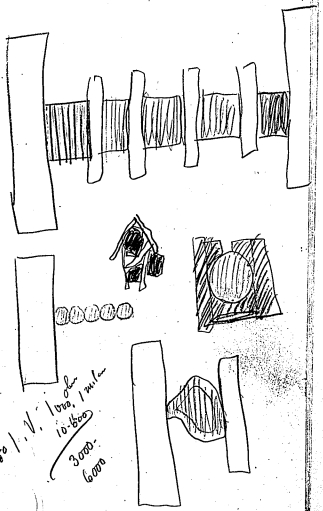
32
16
192
32
512
480

55
13
275
55
715

100
600
60,000

24
270
540
1080
10800
1080

2 volts 1 - 2 amp
2000
100 000
1 mil amp



20

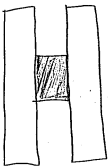
4800
1250
6000
750

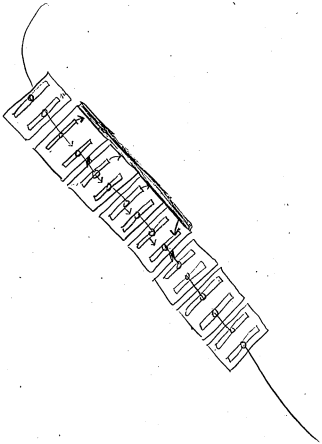
1. N. 1000 ft
1000 1 mil
10,800
3000
6000

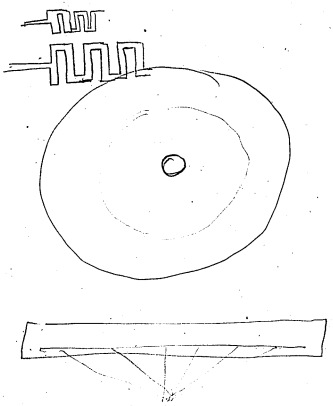
147-

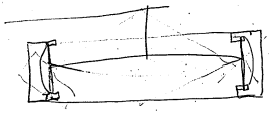
75

170
75
95









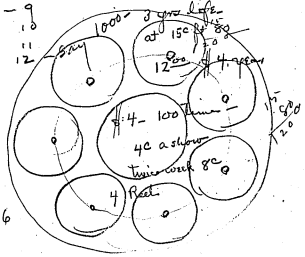
3000 tours twice a week

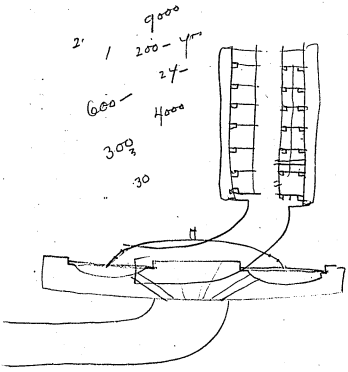
First 2 months — with 10 Travellers
2 per week. 20 week 80 1st month

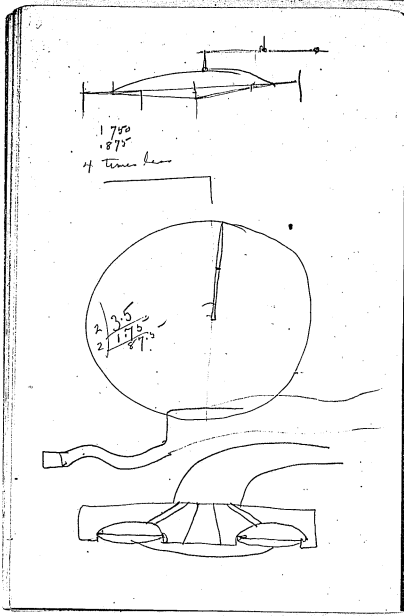
80 1
160 — 2nd month 2
240 3
320 4
400 — 5
480 6
560 — 7
640 — 8
720 — 9
800 10
880 11
960 12

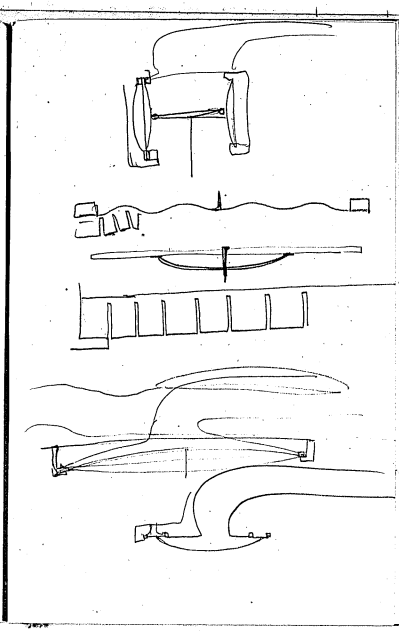
Start with 24 subjects

3000 times worn out
2 Reels at 2 each shows
100 times a year
twice a week.



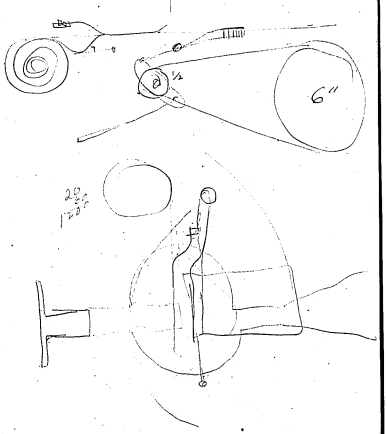



.750
.875
4 times here
2 | 3.5
2 | 1.75
.875



Coil
Rod

K-OH
H_3N



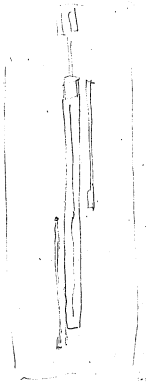
25

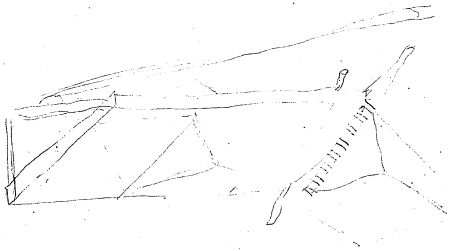
50 sin 60

4 150/90 T

10

6000





5
10
15
20

2.36.

1250
4 / 5000
40
12 50
375

150

450
3 / 1350
4166
8334
33328

225
21 / 705
39
21 19
21 19
2326

7.05
2.33
2 / 4713
2565

6.60.

4 / 850
21 25
8 50
21 25
5 3 25

850
4 / 3400
40
85
255

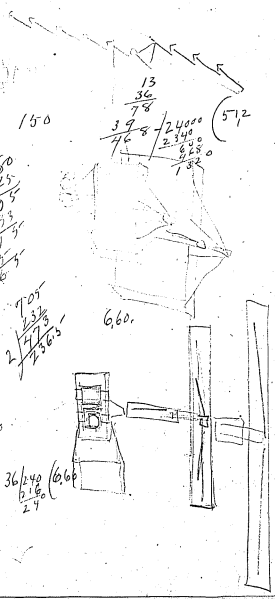
36 / 240
6 60
24

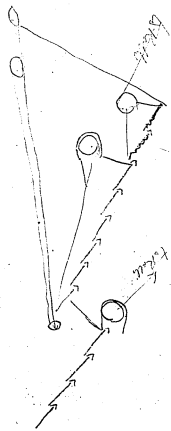
6.66

13
36
78
39
46 8

24000
2340
6 60
5 28
1 32

5.12





o y e h

—

ɔHMATHBTHMA

ABMTAHBATMATHA

ABM

13 – 14

BAMATH

Akamat MAM

HAMMABAT

12 ~~HAT~~

13 ~~HA~~ 1

14 ~~TAT~~ (Hi for tat.)

15 ~~HATH~~

16 AH. 1

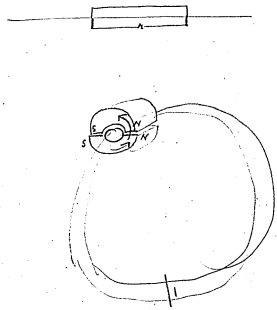
17 ~~BAH.~~ 1

18 MAMA 1

19 ~~HABATAT~~

20 BABA ✓ ab.

21 ~~MAB~~ 1 Queen


E
W
S
N

64)250(4c
64)325(5c
320

5000.
20
100,000.3
300000
60-

25 140.
250
700
20
15 280
350.00

182 24.3
364
120
484

20)200.(10
10 Hours
60c

12
6

500 new

1.54
3.00
90000

4)16000
3750

90000
75000
15000
14000
1000

(24,3

950
375
20
3750

3750)160000(427 8/3750
15000
10000
7500
2500

3750

415
13
352

3000

15000

1 1/2

1500
300
150
75
2025

150,

305

415
60
355

415
145
2075
1660
1875

145
415000
20750000
16600000
4150000
60175000

American Phonograph Co

192
120
384
192
23040

13

230 | 7500 (3,265
6900
6600
6900
1700

3265
13
9795
3265
42445

50
50

325
150
175
150
50%
12345912

Notebook, N-01-09-19

This notebook was used by two unidentified experimenters during September 1901. It contains notes regarding an unidentified experiment with concrete. The material by Edison is found on several loose items inserted into the book. The front cover is labeled "Enamel Experiments." The pages are unnumbered. Only 4 pages have been used.

9/19/07

#1

Hydrated (dry) silica	25 gm.
" Ferric Oxide	12½ "
Magnesia.	1½ "
Caustic soda dry	3½ "
~~Desiccant~~	3 "

#2.

Hydrate silica - ~~[illegible]~~	22½ gm.
" Alumina	9 "
" Ferric Oxide.	6 "
" Manganese Oxide	2½ "
Slacked lime.	20 "
Desiccant	3 "

3.

Silica	13.5	grm.
Slaked lime	8.	"
Caust soda.	4	"
Dratumin	2	"

4

Silica	10½	grm.
Alumina hydrate	6	"
Ferric "	1	"
Slaked lime	6½	"
Dratumin	2	"

#5

Formula made according to the analysis of agate ~~from~~ manual analysis.

Fe_2O_3 Hydrate	-10.1	=	Fe_2O_3 - 8.6
Al_2O_3 "	6.57	=	Al_2O_3 - 4.44
SiO_2 "	61.20	=	SiO_2 - 53.50
Mn_2O_3 "	5.00	=	Mn_2O_3 - 4.22
MnO_2 —	4.01	=	MnO_2 - 4.01
$NaHO$ —	29.9	=	Na_2O - 25.00

#6.

7½ Grams Hydrated Silica
7½ " PbO
7½ " Boric Acid
7½ " ZnO.

Fused

#7

7½ Grms. Hydrated Silica
7½ " CdO.
7½ " Boric acid
7½ " ZnO.

Fetlefuses

#9.

10 Grms CuO.
10 " Boric Acid

reduced to metallic Cu.

[ITEM FOUND IN BOOK]

Gum Tragacanth, ✓
Dextrine - ✓
Thick Molasses
Silicate of Soda ✓
Castor Oil -
Olive Oil - ✓
Syrupy acetate of Magnesia - ✓

Try a mixture of equal quantities of solid powders
Acetate Iron - acetate Lime acetate
Magnesia - acetate Alumina -
Mix these above with equal quantity
of Dry Silicate of Soda - + moisten the
whole with water & grind together
until pulpy so can dip
Dry + then fire very slowly to yellow white
heat =

[ITEM FOUND IN BOOK]

Silica 38 grams
Aluminum hydroxide 31 "
Slaked Lime 12 "
Dry Carbonate Soda 5 grams

Silica 48 grams
Aluminum hydroxide 26 grams
Slaked Lime 3 grams
Dry Caustic Soda 14 grams

Silica 40 grams
Aluminum hydroxide 11 grams
Ferric " 14
Slaked Lime 6 grams
Dry Caustic Soda 1 gram

[ITEM FOUND IN BOOK]

Dry

Amorphous Silica 50 grammes
Hydrated Ferric oxide 33 "
" Ox Magnesia 3 "
Dry Caustic Soda 7 "

Silica 45 grammes
Hydrated Oxide Alumina 18 grammes
" Ferric oxide 10 "
" Manganese oxide 5
Slaked Lime — 20 "

Silica 54 grammes
Slaked Lime 32 "
Dry Caustic Soda 8 grammes

Silica 42 grammes
Alumina hydroxide 23 grms
Ferric " 4 "
Slaked Lime — 26 "

[ITEM FOUND IN BOOK]

P 23 Fe 0, Fe, 40 -
Mett, 1.5

B 63 Mg 30 - Fe 2 fewer 2
Sal acid

Wolfa 75 Fe 18 Mn 5

Gigolte. fewer Al 12 Na 32

7 50 Al 14 Ca 14 Na 7 Si 2
fewer even more easily than Gigolte
Chemglass

Si 52 Fe 31 Mn 3 Na 10
fewer 2 only slightly acted on
50 Al 2 Fe 35 Mn 7.5 Ca 1.5 fewer 2
not affected acids

[ITEM FOUND IN BOOK]

Phos 32 Fe 31 Mn 32 Ca 2
Fluoro 1.5 very low

Silica 30 grms
Aluminum hydroxide 4
Ferric " 59
Manganese " 3 3.7

Silica 32
Ferric hydroxide 32 grms
Manganese " 35

[ITEM FOUND IN BOOK]

Chemic Test.

Fe_2O_3	6.60 %
Al_2O_3	4.44 %
SiO_2	53.50 %
MnO_2	4.22
SnO_2	4.01
As_2O_3	0.02
Na_2O	25.79

[ITEM FOUND IN BOOK]

Al_2O_3 $3H_2O$ 2 — 1.35 Al_2O_3 67.5 % ✓

Fe_2O_3 hydrate. 2 — 1.7 Fe_2O_3 85 %

$Fi\,O_2$ " 2 — 1.75 $Fi\,O_2$ 87.5 % ✓

MgO " 2 — 1.35 MgO 67.5 % ✓

Mn_2O_3 Hydrate 2 — 1.70 Mn_2O_3 85.0 % ✓

2 : 1.35 = 100 : x

135.00 | 2

67.5

1.35 × 50 = 67.50

1.7 × 50 = 85.00

1.75 × 50 = 87.50

1.35 × 50 = 67.50

1.70 × 50 = 85.00

Notebook, N-01-10-18

This notebook was used by Edison during October 1901. It contains a list of twenty-eight items noting possible causes of variations in the output of the storage battery. Inserted into the book is a note from February 1902 by an unidentified experimenter regarding the assay of an ore sample from Grant's Pass, Oregon [not selected]. The front cover is marked "Oct 01." The pages are unnumbered. Only 7 pages have been used.

Iron Electrode
Oct 18 1901

Probable Causes of variations in MAH

1st Steel of cup not springy enough to follow up -

2nd Surface of nickel plating has scum on & dont make good contacts

3rd After discharging large quantity of metal becomes oxidized out of contact -

4th KOH used, variation in amount used

5th KOH used, variation in time of mixing so more or less gets carbonated

6th Bringing into solution within the grid more or less Carbonate Potash due to Carbonation of KOH while making

7th Iron or the oxide more or less oxidized by moisture in the air while making grid -

8th More or less rolling - with variations of KOH —

9th More or less absorbed dampness making the material more or less Elastic when pressed -

10th Variation in quality of Iron in making

11th Variation in changing times

12th Variation in mixing graphite

13th Dies may come together & not give full pressure

14th Briquette plunger may bind due to not always being placed central in the press

15th Time left in Hydrogen when furnace run is complete.

16th Whether or not the Iron is rubbed or ground before putting in mould

17th High pressure on cake may make it so hard that the perforations are nearly closed

18th Not sufficient charging time on ~~[illegible]~~

19th Silica or alumina in Kott, iron forming a film on iron during first discharge which diminished action on second run

20th Deposition of Arsenic or Copper etc during charge which during discharge makes an oxide which gives local actions during charge & discharges -

21st H_2O_2 or KH_2O_2 may be formed in charging solution which if the current is broken some time before grid is removed to test cell may cause a film of oxide to form & make some of the iron inert =

22 There may be an Fe_3O or Fe_4O

23rd Unseen distribution of material in the mould might make hard & soft spots or one side or edge soft the other hard, also ditto at Each end of Briquette, Thus producing no pressure of Cup on parts —

24 space at sides may not come down on crimping, + leaves a void The wetting permits swelling + disintegration of this point which in time would Extend to whole of the Brick

25 The Ends not being crimped like the sides leave a soft end or void permitting disintegration

26 Bad Contact between grid & cup

27 On account of small pressure 150 at ~~the pa~~ only a few of the particles are forced together in contact,

28th In changing so much of the stuff comes out on a badly pressed grid that it permits gradual disintegration by the liquid & gassing

Notebook, N-01-12-03

This notebook was used during December 1901. All entries are by Edison. The book contains entries, numbered from 1450 through 1486, regarding a set of nickel-iron storage battery cells. Included are notes relating to each cell's rate of electrical discharge and to the production of gas during the tests. The numbered entries do not appear to correspond to those in a concurrent series of cell test notebooks, N-01-12-12 and N-01-12-15 [not selected], which also encompass numbers 1450-1486. The pages are unnumbered. Approximately 60 pages have been used.

N. F. Bailey — Dec 3rd 1901

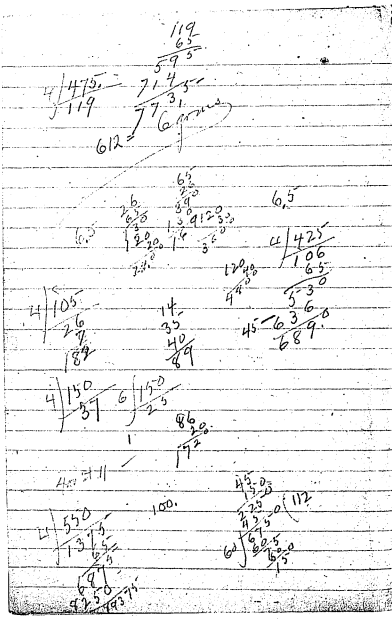
For circulation, per dead persons cup
mixed —

Lauder —

Instead of Ni hydroxide, use Ni_2O
Reduced by H from Oxalate,

Also heat Mix of Ni hydroxide
graphite, 100 Rollings by Dry
Chlorine, to peroxidize it, make
grid & soak to get out NaCl —

14th Dec - $NaC_6H_5O_7$ = KOH, washing 6 oz
" " " + Hypo 5 oz
" " " + alone no pay



gram with grid — 8442 Ni ox by KOH — 4 gram

1452 — 1046 am on = 11 am diff expanding within grid squares at slightly grid dot seems to show swell — 1101 a very little going
growing 1% of full at 1121 am
think of notice slight swell of grid —
1130 am growing 1½% of full —
on 1235 — 1240 pm no glow
on 1 hour 29 minutes growing 1½% —
140 pm growing 2%
after 2 hours + 9 minutes gas 2%
bubbles still form on outside of grid
gas lifted & clinging to grid —
217 pm growing 5½% —
3 pm / gassing 10%

Swelled from 86 to 103 17 swell —

Monday — 845 am put on reservoir
400 till 9 am 1 hour 15°
9 am no gas — 9:27 no gas
212 Mah at 945 am — no gas
250 " " 10 am — "
325 " 1030 AM "
350 10 40 "
400 " 11 AM "
425 1110 " "
475 — 1130

Mah at 3 pm
Gas 2%

3 34

1046 to

2 ½ hours but

2 30

3 15

1 1 1 1

14

14

35

60

2 9

grav. mch 4+2 N2OK by KOH –

1451 On 1046 11 am stuff expanding within grid appears cont slightly grid dist seems to swell 1101 am shows faint gravy –

1121 am gravy 1% of full –

think 9 inches slight swell of grid

1130 gravy 1½% of full

on 1235 1240 no grav

on 1 hour 29 minutes gas 1 @ 1½%

1140 pm gravy 7%

after 2 hours + 9 minutes gravy 2%

Bubbles still from oil along the black cliff expanded from + changing to outside of grid –

217 gravy 5%

3 pm " 10%

4 pm 15%

Green material grid
NOX by ROH

DEC 14 1901

203

1450 - On 1046 - some of the green came out but it was probably in outside indentation
It also started gassing slightly when put on 1107. The gassing is just the same now if anything + very small - 2% of full probably
The grid had a welled slightly but not much -
Noticed when current was off for 1 minute the gassing kept right in - possibly it was that was originally in coming out by gradual swelling of material
1118 - gassing a little more freely about 8% of full -
1122 am noticed a froth around top of binding post that is a bracket from the others -
1130 gassing abt 8% of full
on 1235 1245 gassing 8%
1120 gassing 10% after being on 1 hour 34 minutes -
140 gassing 12% -

On Regular discharge this only was it 48 minutes down to 75 -
Showing greater necessity of graphite.
put back on charge 930 -

Pb_2O_3 842 – by green NiOx by KOH, by H_2O
group 842

No 1454 on 1110 am

1116 am – stuff squirting out slightly, & it is going slightly – a large number of gas bubbles collect on outside which is brown. 1128 going 5% of full
1130 going 10% which is much more than 842 green

on 1235 1240 going 10% —
103 pm going 12% Bubbles stick
Wire still clear, No swell yet
110 going 15%
140 going 15% – 217 go 20%

N_2O_3 from Green N_2O_4 by KOH by Hypo grav 8842

415 gram cake

1455 on 1110 am —

1116 am stuff squirting out slightly
gets growing slightly a large number
of gas bubbles collect on outside of
gas. 1118 growing 5% of full —
~~Short notice slight amount of gas 1120 am~~
@ 1130 growing 10% volume is much
more than 8422 gasen —
On 1235 1240 growing 10%
103 pm growing 12% bubbles still
hanging all over No swell yet.
110 growing 15% 140 growing 15% —
217 gas 20%

Swelled from 105 to 118 13 swell

Monday 845 put on recovered
400 ma till 9 am — gam 150 —
No gas —
at 1122 gas started
1125 gas full —

450 mah —

This is heavier cake than
1452 + 1452 has gone 450
without gassing —

150 measurement

137

137

15
4
6
6

150
3
4
2
0

100

100
3
4
2
0

50

105
13
3
5
0
120

105
13
3
5
0
120

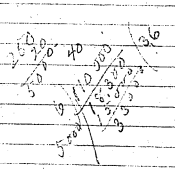
1110

425

2

Our Clock 25 M

Now —



N_2O_3 without graphite – green N_2O_4 by KOH, by Hypo

1458 on 1132 am – No graph (block) –
off 1135 or Noon –
on 1235 pm – 1240 – ½% gas
& no stuff splashing – plate rather
clean – a few bubbles collecting
on outside 1.05 pm – no squirting
out of material, clean ~~no gas~~
gassing 2% – Very little stuff
fallen from grid & that is from
outside probably.
1.15 pm on 43 minutes gassing 2½% –
140 gas 8% – all N_2O_4 + Hyper + 8/minute
1.55 – nothing squirts out gas 10%
Clean grid –
2.10 gassing 12% – 442 gas full –
at 442 Reversed the Coil to see
how long before it would stop gassing –
at 450 gas nearly stopped
& reverse back at 453 pm to Ordinary
No gas at 457
at 504 gassing nearly same as when
disconnected & reversed.

Monday 845 put on Reversed
855 gassing full –

Na_2O_2

Na_2O_2

Na_2O

14

1046 24

24 3

Remarks about preceding tests.

I pulled plug for 1/2 minute but gassing wasn't light on all grids.

pulled plug 7 25 till 7 27 — gassing on all dimmed only

1/3rd = I noticed on the road of test Mixture gassing Rept. undimmed —

Phenomena —

I notice that all of the stuff containing graphite that falls from grid into bottom of glass has big gas bubbles clinging as it leaves bottom of jar (Observed like black stuff from 1453 Na_2O_3 that had no graphite mixed layer at bottom of jar without a bubble on it) also the green in 1450 — Can there be local action)

Notice gas bubbles from which on
frame
No gas bubbles which can be found
faced up of 1450 —
Barely any except in one
Operation 1453 —
So far the green 692 seems to be best
"

on 1030 Received

100 grams KCl 1438 not growing at 30°
415 growing 50%

200 KCl 1439 315 growing 50%
There was a lot of foam formed on the 1st chip
the also overlay at 1 hr. Va. Stopped good thin growing
of others - 3110 growing

300 KCl 1440 - 315 not growing
430 gro 50% full 435

400 KCl 1441 315 not growing
Standard gro 445 gro

500 KCl 1442 315 not growing
341 growing strong 50%

600 $KClO_3$ 1443 315 not growing
415 growing full

700 $KClO_3$ 1444 315 not growing
435 growing

800 $KClO_3$ 1445 315 "
4 growing

900 $KClO_3$ 1446 315 "
435 growing

over

Removed all only—

Mixture 2 parts NO 1 pt N_2O_3 - NO prod — by Roth & Hupe prelim.
2 pt N_2O_3 + N_2O_3 —

1458 = on 307 pm —
322 growing 15 ½ — S
Now why does this go right off?
430 growing fast —
This seems to be NG — S S

Monday 845 put on recovered
855 growing full —
but the brew 400 ma involved 150
at 9 am 150

1460 ON 525 pm — 842 Kottmeier

fine grained low pitch heating No OX

by KOH — Very dark brown creeping

on Black —

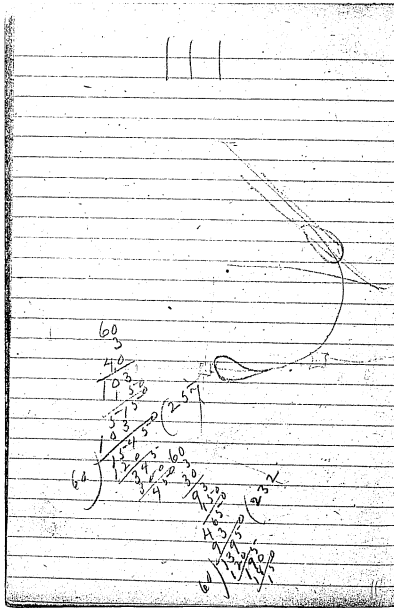
545 ~~[illegible]~~ g among

8 1/2 —

1460

842 mix
Kore mat
1461 – Same as 1460 Cut not ground
– Lumpy + unsquareness, heated long
time in porcelain Evaporated
dark brown nearly black
on at 535 –

Monday 845 am put on reoxed
400 till 9 am – 9 am 150 ——
grams 1/2 at 9 –



1452 Continued - has been reversed
Reducing till 500 mah + little growing
for 1 hour reducing - it is reversed
Only or charging at 1,07 pm —
1% growing at 8/0. —
380 11% growing - 4 pm growing 6%
432 mah —
Reversed 435 — at 6.35 pound
Was 175 now 150 635 —
Was charg
gased 700 — 500 mah
at 8/7 Reversed charging —
950 - trace gasing 232 mah —
10 pm " " 257 "
1020 1% growing 307 mah
1030 2½% " 332 "
1050 5% " 387 "
11 — 5% 407
Went home —

60
10
25
95
150
475
95
380
28
60) 1400
120
200
140

12) 120
120
0

6) 140
25

1455 (Continued) fully charged & gassing on over charge 1 hour
recovered chg (10) ampz at 107 pm —
172 ma on Ront Rubo how long
150 at 135 pm - 215 just a short flow
of gassing — 1% gassing at 310 -
335 10% gassing 4 pm gassing 15%

Reversed 435 pm discharge
at 635 pm 175 ma 175 now
635 150, no gassing
good 720

410 mah

Reversed charging 7.50 pm —
855 no gassing 162 ma
9.25 - perceptible trace of gassing 237 mah —
945 1/4% gas very small 300 mah —
10 pm gassing 2% — 325 mah —
1020 10% gassing 375 "
1030 15 " 400 "
1050 25 " 450 '
11 50% 500

Went home —

1468 gwa-mi in furnace
very block —
on charg 835

10 pm	no gas	212	mah no gas
1030	"	300	" "
1050	"	337½	" "

21) 150 (5
105
45

15 595
150
195
150
450
450
0

60) 1295 (21 12
120
195
120
750
600
150

1469 9wa
Influence very Black
on chg 835
10 pm 212 Mah no gas S
10 30 300 " no gas
10 50 337½ " no gas

60 | 17.(1,28
600
170
120
50

77
150
385
57
60 | 192
115
60
55
54
1

1455 – discharged in Solution of 400 cc Water 215 grms Stick KOH, I figure 35%
KOH —

at 1110 started gassing full all at once discharging
gassing on frame
Reversed chg at 1120 am
immediately stopped gassing on reversal
~~1147~~ – off 10 min —
at 1247 gassing 1/2 % — 192 mah
1 pm " 1/2 %, no chg 242
117 pm " 1/2 no change? 284

	120	1/2
145 pm	3%	
225	8	
235	10%	nothing yet
300	10%	
310	50%	
315	75	

284
90
3 54

284
90
1 40
2 00
42 00
40
43
60

192
60
24

1 40
15 40
60 00
13

17
13 50
10 50
1 00
5 00
75 00
142
60

1452 35% Sol same 1455

1110 not yet gassing –
1115 started gassing & in 5 sec
gassing full – gassing on frames.

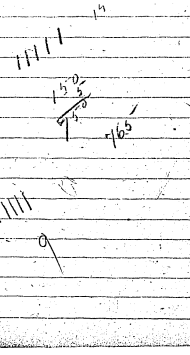
Reversed chg 1120 am –
many dropped gassing on reversal
Stopped 10 minutes.

at 1247	1/4% gassing	192 mah
1 pm	1/4 gas in manifold	242 "
117 pm	1/4% no chg.	284
1/2 at 145		354
1% at 225		454
5% at 235		
10% 3 pm		
20% 310		
75 315		
full 330		

not very fast

charging up to 5 pm

On disch 5 pm



Bre19—

Experiments with 100 pass Reg Ni grid in 20% KOH with different impurities in the liquid to determine their effect in all connections with regard to the battery.

All these been soaking all night—

~~CuO_2H_2 in 20% KOH Sol. 0.5 gram~~

On 915 A.M. – 150 m.a. charge—

CuO_2H_2 = 924 gassing 1% —
950 – 1050 % gas – plat pole all covered with spongy Cu. 1012 gassing 1/2 %
1054 gassing 1/2 % 1120 2 %
12 65 % 1230 45 % /
1 pm 35 % 145 50 % 215 full
from – Cup bright.
Read dredy 320 420 no gas 520 no gas 550 no gas
625 no gas

on 915 am

1 pt K Nitrite 20 pts Roff.

1012 very slight growing

1120 3% 12 noon 5%

1230 10%

1 pm 50% 145 65%

215 75% frame & cup do normal

Reversed douche 320 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

1 pt RCy 20 KOH

10.12 very slight growing 1/4 %
grid very bright & clear 1120 1/4 %
12 noon 1/4 1230 ~~[illegible]~~ 1 %
1 pm 5 % 1 45 pm 20 %
215 20 % frame & Cup bright
Revsd Ducks 320 pm 420 no gas 520 gas filling

4 pts RCy — 20 KOH on 915 am
1120 no gas —
12 noon no gas 1230 no gas
1 pm no gas 145 pm 10 % 215 — 10 %
by pulling light behind I find that at 230 there is not more than 2 % growing
The Solution is quite yellow red — grids bright.
Rcy radical keeps inner pore alkaline —
This may be a big thing if no secondary reaction or neutralizing or action on frame
~~frame & Cup Rcy bright~~ —
Reversed ducks 320 420 growing full 5 mg

on 915 am

1 part H_2SO_4 to 20 KOH, large precip at bottom 1¼ high

1015 growing 1/4 % grid very bright & clean

1120 50% / 12 noon 10%

1230 25% 1 pm 75% or full

145 full — 215 full

Cells bright,

Reversed polarity 3 10 pm — 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

50 milligrams CoO_2H_2 in Cell

1120 grid + cups all covered black

no gas — 12 noon 3%

1230 10% 1 pm 25%

145 - 50% 215 full!

Removed block 320 pm 400 no gas 520 no gas

550 no gas 625 no gas

on 915 am

200 Milgms CoO_2H_2 in Cell

grid + Cups Coated black no gas

at 1120, 12 noon 6%

1230 20% 1pm 30% 145pm 50%

715 full

Reversed Discha 820pm 470 no gas 520 no gas

550 no gas 625 no gas

on 915 am

1 part Silica 20 KOH

11 am gas 1/8 % 1120 1 %

12 noon 5 % 1230 10 % 1 pm 20 %

1 45 pm 50 % 215 50 %

Reversed electrodes 320 pm 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

1 pt Silica - No 2 1120 am. 1 %

12 noon 5 % 1230 15 %

1 pm 30 % 145 pm 50 % 215 50 %

Reversed Electrodes 320 pm — 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

Cell Saturated with Lime

prep. 1/4 deep at 6 Gallon

Can't see water but water no gas 11 am

Can't see gas 10 1/2 1230

~~Rev~~ Reversed Discha 320 gm — 420 no gas 520 no gas

550 no gas 625 no gas

No 1 on 9.15 am

1 part Sulphide Potash 20 KOH

950 Sulphur depositing on Cup

1035 few bubbles attaching to Cup

1/8% gas 11 am no gas

1120 Cup very dirty gas

bubbles pretty black 12 Noon no gas

Lots bubbles adhering

1230 1/4% 1 pm 10% 145 - 50%

215 500%

Revised Dirty 320 PM 420 no gas 520 no gas

550 no gas 625 no gas

No 2 on 9.15 am

Duplicate

952 Sulphur depositing on Cup

Very few bubbles attaching no gas

11 am no gas

1120 Same as No 1 12 Noon No gas

Lots bubbles adhering 1230 1/4%

1 pm 10% 145 pm 50% 215 1/4%

Revised Dirty 320 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

Woodpaper boiled in the KOH 20%
Sediment 1/16 thick at bottom
950 (a few gas bubbles attached)
no growth — growth 1/16% 1035
growth 1% 11 am
1120 growth 3% 12 noon 5%
1230 20% 1 pm 50% 145 75%
215 full grid block in opals
Dark darkened solution yellowish
Record Density 320 PM — 420 no gas 550 no gas
625 no gas

NO 2 on 915 am
Duplicate. grid coated
Connected with gas bubbles + slight
signs of growth 950 1035 growth
1/2% growth 1% 11 am
1120 growth 3% 12 noon 5%
1230 20% 1 pm 50%
145 pm 75% — 215 full — grid or
same block in opals Solution yellowish
Record Density 320 PM — 420 no gas 550 no gas
625 no gas

on 915 am

Cell Estimate of Barium Carb
Sediment 1/4 thick 950 growing 1/2 %
bubbles allowed to Cup 11 am 2%
1120 5% 12 noon 8%
1230 30% 1 pm 50%
145 full
Revised Ovsky 320 PM 420 no gas 520 no gas
550 no gas 625 no gas

X02 on 915 am
Duplicate 930 slight growing
950 growing 1/2 % bubbles allowed
to Cup — 11 am 2%
1120 5% 12 noon 7%
1230 30% 1 pm 50% 145 pm full
Revised Ovsky 320 PM — 420 no gas 520 no gas
550 no gas — 625 no gas

on 915 am

1 part Oxalic acid 20 KOH,

1005 few bubbles attaching to grid

1035 growing 1% to 1½% 11 am 1½%

1120 8% 12 noon 15%

1230 40% 1 pm 75% 145 full

frame + part Cup darkened

Revived Arcing 320 PM 420 no gas 520 no gas

550 no gas 625 no gas

on 915 am

5 parts Oxalic in 20 KOH

1005 growing 1% 1035 growing

2% — 11 am 3% —

1120 growing 15% 12 noon 15%

1230 50% 1 pm 75% 145 full —

frame + part Cup darkened

Revived Arcing 320 PM — 420 no gas 520 no gas

550 no gas 625 no gas

1/4 sat BaOH, on 915 am —
Cloudy slight sediment.
11 am 1/4 % 1120 1 %
12 noon 5 % 1230, 20 %
1 pm 33 % 145 full frame + Cup
bright
Recd Discdg 320 PM — 420 no gas 520 no gas
550 no gas 625 no gas

Saturated BaOH. on 915 am
1/4" Sediment
956 gassing 18 % bubbles attached
to Cup — Schwartzliff (black) coming out
of falling Surface Cup whitening
11 am. 2 % — 1120 3 %
12 noon 8 % 1230 25 %
1 pm. 40 %. 145 full — frame + Cup
bright —
Recd Discdg 320 PM — 420 no gas 520 no gas
550 no gas — 625 no gas

2 parts Nitric acid 20 KOH on 915 am
1005 few bubbles steady
1015 growing 1/4 % 1035 1/4 %
11 am 50 %
1120 10 % 12 noon 15 %
1230 25 % 1 pm 75 % 145 full
foam + Cup about as usual
Record Daily 320 PM — 420 no gas 520 no gas
550 no gas 625 no gas

5 parts Nitric acid on 915 am
1005 very slight growing
1035 growing 2 %
11 am 6 % 1120 15 %
12 noon 20 % 1230 60 %
1 pm 75 % 145 pm full — foam + Cup
about as usual —
Record Daily 320 PM — 420 no gas 520 no gas
550 no gas 625 no gas

1448 Special KOH 8 on 915 am
955 gassing 1%
1015 gas 5% / 1035 7%
11 am / 10%
1120 / 15%
12 noon 25% 1230 80% 1 pm 50%
145 full
Revised Quiz 320 PM 420 no gas 520 no gas
552 no gas 625 no gas

1444 Special KOH 9 on 915 am
955 am gassing 1% 1015 gassing 7%
1035 9% 11 am 10%
1120 33% 12 noon 40%
1230 full gas 1 pm 80% or full.
145 full
Revised Quiz 320 PM 420 no gas
520 no gas 550 no gas 625 no gas

1481 Discharg 320 PM — gas full 420 mg

1480 Discharg 320 PM 420 full — mg
mg —

1479 Discha 320 PM 420 full ng

1476 Discha 320 PM 420 full ng

1477 Dischg 320 PM - 420 full ng

1476 Dischg 320 PM 420 full ng

1475 Dischg 320 PM 420 no gas
520 no gas 550 gas full

1474 Dischg 320 PM 420 no gas
520 no gas. 550 gas full

1455 35% - Crystalline ORF - old test
g notice that the grid + cup unlike
all other models is coated dark Brown
Discharg 3.20 PM - 'no gas - 520 shadow of gas
550 no gas 625 no gas

1452 35% ROH.
g notice ~~that~~ grid + cup unlike all
other models is coated dark Brown
Discharg 3.20 pm - 420, shadow of gas
520 shadow of gas comm at 420, 550 no gas
625 no gas -

on 915 am

1468 swelled nearly as much as 1469
12 noon 3%
1230. 15% 1 pm 40% 145 full
Discharg 320 pm 520 no 90

on 915 am

1469 Swelled Enormous
12 noon 30% 1230 15%
1 pm 40% 145 full
Reversed Discharg 320 PM 520 no 90

1483 on 1012 am
1130 gasing 25% —
12 noon full gas
Rwad Dinlg 320 pm 420 gas full ng

1484 on 1012 pm 1128
gasing 25% noon full gas —
Rwad Dinlg 320 pm
420 gas full ng —

1 part K Vanadate 20 KOH on 1040 am
1054 growing 10%
12 noon gone down to 1%
1230 3% & pm 5%
145 20%
302 full
Revived slowly 320 PM 420 no gas 520 no gas
550 no gas 625 " no gas

1 pt Manate Soda 20 KOH, on 1040 am
Contrea
Revived slowly 320 PM

No 2 Cupric Hydrate in KOH

on 1040 am

1050 growing 5%

1230 5% | 1 pm 15%

145 25% 215 50%

Reversed Dissolving 320 pm 420 no gas

520 no gas 550 no gas 535 (15 min) gas full

1485 on 1106 am
12 noon no gas no swell
1230 no gas 1 pm bubbles on no gas
145 - 1/4% 215 10%
Reboil Dosing 320 pm 420 no gas
520 gas full - last time on neg

1486 on 1106 am —
12 noon no gas no swell
perhaps a little 1230 pm no gas
1 pm bubbles on no gas
145 1/4% 215 10%
Reboil dosing 320 PM
420 no gas 520 gas full - last time neg

Notebook, N-Undated.2

This undated notebook was probably used sometime during the period 1901-1902. All entries are by Edison. The book contains notes and drawings regarding the technical details of cement production. Included are items pertaining to the temperature of the kiln in the roasting process and the degree of fineness needed in the ground cement rock. The pages are unnumbered. Approximately 170 pages have been used.

N-00-00-00.2

Burning Portland Cement -

It is stated by Expert of Lehigh Cement Co that they use 150 lbs of powdered bituminous Coal per bbl of Portland Cement presumably 400 lbs -
That the terminal temperature of gases leaving roasters is 600 deg Fahr. If this is Correct. The Heat units with 7% ash 140 lbs Carbon would be

BHU 16,240,000

40 — 60

lbs min

4000
16
32000
40000
2 3 1

21 10 5

5

35
17 5
521

18

720
60
432 00

35 1/2

17 5
2 2
32 48
17
5 | 103
21

HU in Exit gases 540 deg above the temp of atmosphere 60 Fahr is

2.467.000

Expulsion of CO_2 from CaO.

1.940.000

Radiation assumed as 350 or 290 above the atmosphere from furnace & Cylinder

1.074 000

HU in Clinker supposing it leaves burner at 2000 Fahr

1.364.000

Decomposition of 19 lbs
of water in air of combustion

133,000

Dehydration of silica -
125 000 -

Heat of clinkering
or semifusion - 1,500,000

HU in fuel	16 240 000
	2 467 000
Exit gas	1 940 000
Explosn CO_2	1 074 000
Radiation	1 364 000
in Clinker	1 600 000
Clinkering	133 000
Water	125 000
Dehydrat	8703 000

16 240 000
8 703 000
Unaccounted for - 7,537,000

Either the Exit gases have a much higher temperature than stated or the temp of Cylinder is much higher than 350° or the Coal is not burnt to CO_2 but to CO or there is a great excess of air which would give more Exit gases —

The analysis shews that the temp of exit gases must be low, that the C must be burnt to CO_2 with some excess of air to diminish vapor tension of CO_2 to permit expulsion at low temp from limestone —

That Regenerative device must be used on Clinker —

The speed of the gases through 6 ft cylinder is 122 ft per minute which should not blow out

fine grinding of the Limestone + Cement rock + a thorough mixing is very important before going to roaster – as well as proportioning the rock to give no free lime to slag the fire brick or hurt the cement,

Note – Decompn of $CaCO_3$ starts at 440 C = 824 Fahr If the pressure is kept below the limiting pressure or maximum vapor tension the whole of the $CaCO_3$ is decomposed

Vapor pressure of CO_2 from $CaCO_3$
at 860 C or 1580 Fahr
is 85 mm (3 inches) of Mercury
at 1040 C or 1870 Fahr it
is 520 mm (18 inches) of Mercury

Caustic Lime Combines with
incandescence with CO_2
at 550 C or 1022 Fahr
The Compound formed is
$(CaO)_2\ CO_2$ This Compound is
capable of absorbing more CO_2.

25)85(3
75
10

25)520(18
25
270
250
20
20
0

30)1520(28 inches
240
280
240
40

23.8

2/75
37.5
3
1121

23.8
17.8
61

23.8
3
14

4) 17.80
4.45
13.35

778
67
1246
1068
11923
5
59630

238
25
190
476
595

17.8
5
89

67 ton Crushing 6 cheaness
75 lbs — 17.8 %

with 9 cheaness in 50 lbs to
the same thing =
hence 67 ton 17.8 gwes
gwes 59.6 66 lbs
100 tons with 17.8 gwes 89 lbs —

112 lbs pressure gwes 23.8
75 — 17.8
6 difference

50% more pressure gives
only 25% more fines —
hence Reduction to 37.5 lbs
pressure should reduce it
Certainly not less than 25%
or to 13.35 — the power
would be reduced from 17.8 to
35 —

hence 128 tons would go through on 35 lbs pressure gives 17.08 tons —

12 | 80 | 6,6
72
8 0

14
66
84

15
66
90

84
92 2

90
99 0

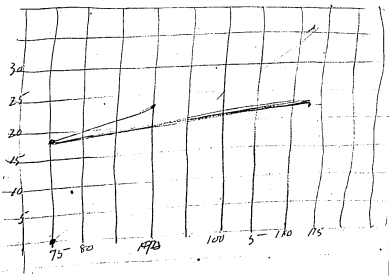
15 4/7"

1335
124
1068 0
267 0
13 35 0
17 08

80 66 2/3

100 -

25



20% on 800 tons
16% with 1000 tons —
#/14 flake —

125
16
750
125 0
2000

79
60
395 -

40 -
2000
80000 -
3 / 26666 + Thompson

102. 100
Francis
48
Thompson

1200
12
16800
14412
2388
144000
16 / 1728
1728
1728

1728 / 10800 (6,2
10368
432
10800

110
62
120
6600
6600
68200
4rd / 409920 (102
4rd
9920

16
60
96

960) 71.400 = (74
672
42 00

80 000

6

10

45700
2500
2700

18
30
54 2
108
540
648

66 240
2500
2700
71.44

96
470
672
384
45 1 2 0
24
80
19.25
96.00

3.7
80
296

36
80
28.85
144.0
460
864
576
6.624 0

6 75 Red

1726) 6480 (37
5 180
1 3900
1207

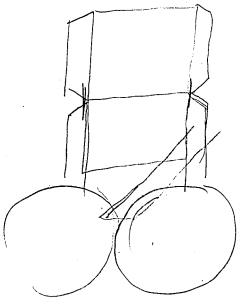
16
16
96

16
256 80
204 8

Thompson

2400) 1776 (14
1600
460
2760

204
50
1726) 10200 (6
1036 8



25
900
225

9720
25
48600
19440
243000

8 / 243000
3037

2240
125
1200
448
2240
2800

25 / 2800
29296

105
130
315
105
13650

3037 / 60
1822 20

90
878
12
620
610
97

16 100
1/8 - 200
1/4 - 400
1/2 800 - 6012 -

9720
96 / 291600 - (3037
288
3860
3850
72

48 / 1200 (25
96
240

2500
60
150000
120000
300000
288000
2000

400 / 150000 (375

1728 / 3037 (1.7
1728
13096
12096

130
17
910
130
2210

170

230
3800

1.47-

4)14.7
3.7-

490
493

100)147
100
47
47
7

14.7 -

1/4

3/16

100-

14
28
56
28

115
25
460
230
2760

96)2250(23.4
192
330
288
420

49)276(5.6
245
310

49)72(1.47
49
230
196
340
343

3/16 = 3/80

234
130
702
234
30420

5.6

2240)82552(36.8
79220
3320
2240
1080

5

10-

3555
35
17775
10665
12442.5
2) 6622.12
79
576
448
505.6
34.0
47.4
79
40
37.6

62000 lb

pressure of
1 on 1
moves 003 -
3 moves 009
hence 3 times work
of same pressure.

20
35
600 -

3555

474
35
2370
1422
1659

4977

1659 3000 - lbs every 2 minutes

39

28
3
84 - tons -

4) 25.00
6.25
187.5 -

2 50
14
400
50 00
50 00
9

28
35
140
84 0 -
98

35 2000
70 004
60) 70 00
60 00
10 00
10 000
4

116 mi - 25

116
6
696 00
696
2240) 2176 (18
2240 00
2200 00
1936

1659
35
58065
8295
29032

Air motor
Rehearsal – Drill –
Orly
Coal separation
Fine coal burning
Meters
Storage Battery
Marconi
Portland Cement

500 Kp

363
2
726

1200 100000

35000 | 200000 | 363
99000 | 125
21000 | 488
19800
1200

850 Kp

600-

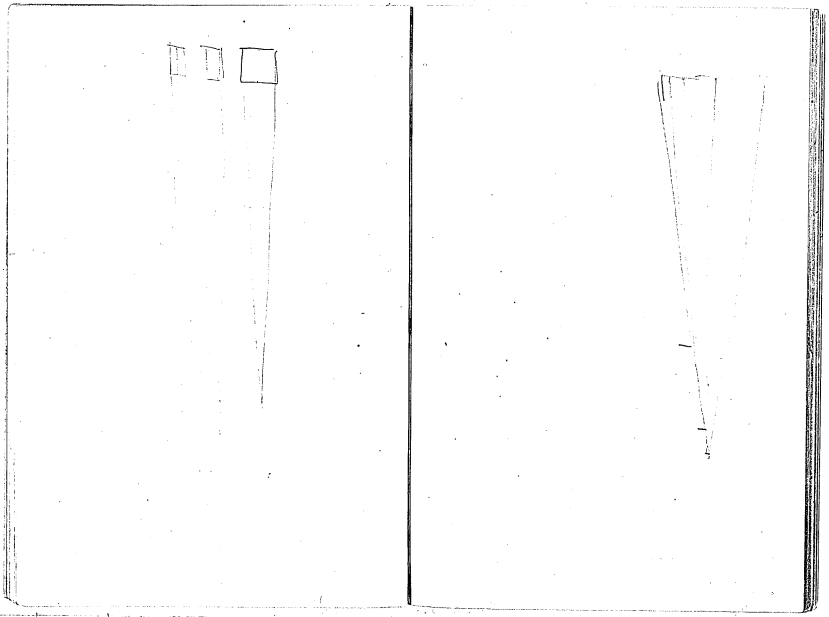
1 / 1200- | 100000

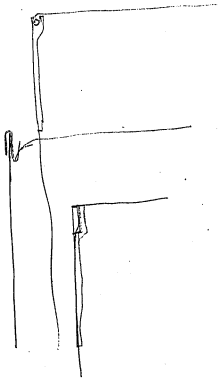
1200000

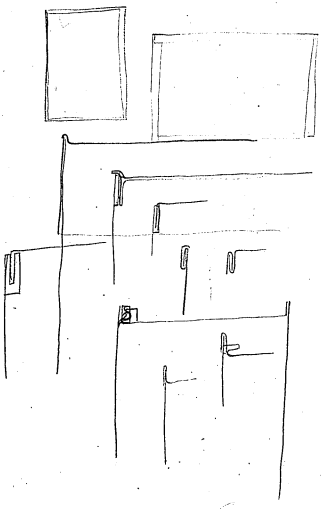
144
2
288

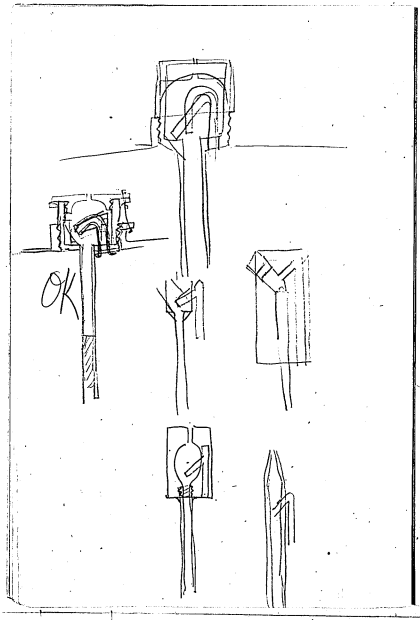
30
600

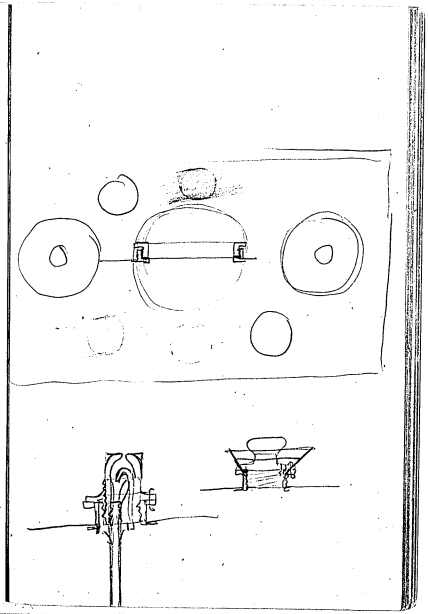
288 / 100000 (348
8640
1360
1152
208

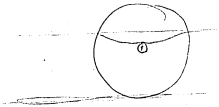




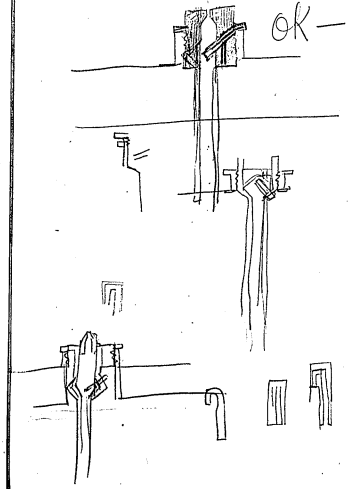


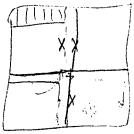

OK

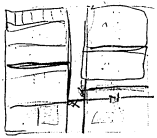


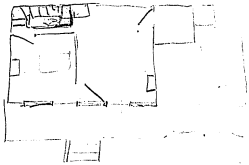


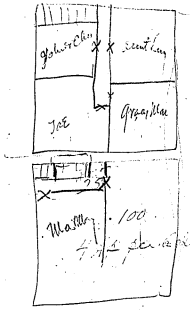
21-
14
7











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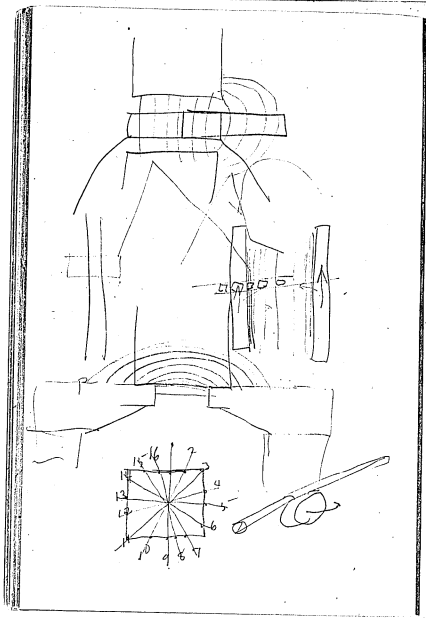
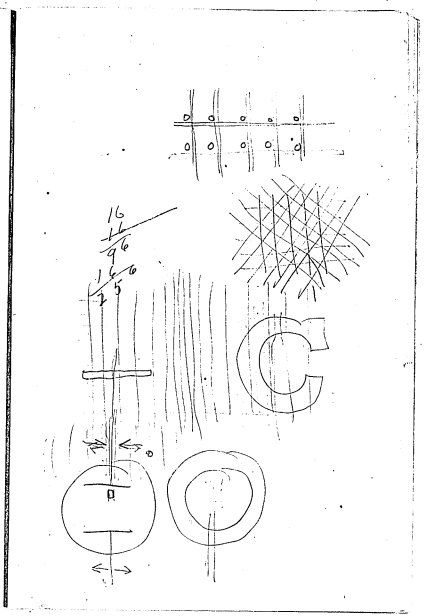
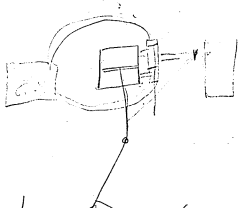
16 -







8 3849 / 8 380 000 (99
75 - 45 60
8 3 24 00

99 miles

Zinc 55 lbs – 15c 825
55 20 1100
559400 / 925
75
55 / 20 / 1100
2 79700 20
39 / 1580 00 15
4195 00
55 / 75 / 825
419000 net

55
444
300
14 00 / 1 3 3 2 60
7 9 9 2 67
559 44 00 / 1265
15
55
8
440
825
1265

1 cell 419000 net ft. lbs –
20 cells –
8,380,000

55 40 80
20
8 / 1600 – 5240
16
200 – 31440
5240
8384

36 / 2000 / 55
1800
200

HCl — fused NaCl, H_2SO_4

NH_4 — H_2SO_4

$CaCO_3$ — Caustic K

CaO, CO_2. Pour off the PO_4 & H_2SO_4 giving CO_2 mixed with O — thence through a heater to expansion cylinder

If there was 32% fines in the 67. Tin & all the oog came through with it There would be 34% on 200 mesh — but not more than ½ will come through while 3/4 of float come through hence 27.8 on 200 mesh

lb

hence — 34 66 float

17
44
61 | 170 | 22 | 27 | 48
45 0
427
53 0

28
1 80
224 0
7900

28 | 66
3 | 420 | 22
12 | 420
3 4 0
2 1 6 0
1 9 6 0 0 0
120

9480
420
8 8 8 0
3 7 9 2 6 0 0
3 9 8 1 0 0
3 9 8 1 6 0 0 0
3 9 8 1 6 9 8 0 0
6 6 2 9 8 0 0 0
1 9 8 0 0 0 0
1 0 8 3 6 0 0 0 0
9 9 3 6 0 0 0 0
9 9 2 0 0 0

120
74000
774
5600
3.4

79
1 2 0
1 5 4
7 8 4 0
9 4 0

1.5
54
6
7 3 0
8.1

Total in 61. 009
" " 13 float
74

3.6% float in — 82.5 009
17.5 float —
17.1 of 009. —

Had there been
7.2% of float
70 009
30 - float

10.8 float. 61 009
39 float

with 14.4 float
54 000
46 float
48.4
51.6
44.9
56.1

25.2% 40-000
60 37
63 1000
28% 180% float —
34
66
32% float 21.6 float

13
4
52
66
113

6100
3900
100) 390 (39
300
90

108
36
14.4

355) 610 (17.1
355
2550
2485
65

1000
516
48.4

14.4
36
18.
61
79

1000
561
44.9

13
5
65
61
126

113) 520 (46.
452
68
60
8
200
26.
87) 260 (30
261

74) 130 (17.5
74
560
518
420

13
6
78
61
137) 780 (5.1
685
830
834
160

1000
175
825

355) 13000 (3.6
1065
2350
2130
220

(1000
630
3000
2220
740

82.5 009
17.5 float –

70 – 009
30 float –

30.5 –
130
43.5 / 1300 (30
1305

12
104
6
165 (1040 (6.13
990
825

61
26 –
87 (260 (30
261

36
8
288

13
8
104
165 (1040 (

115 –

70
3
210

31
28
3
87 / 260 (
228
32.2

15
18
270
27
243

45%

36
9
324

82.5 009
17.5 float

13 – 61
13
74 (130 (1.75
74
568
518
50
4.2

1000
173
825

90-foot-thinks 20% usual 90 always
10% float –
10% Lean & amount 10% 90
the 20% – 90 & 90
200 hour – Doesn't 90% on
of 20% Wherever 90% on
Where of the 20% Cement –
of 20% on 200 –
Where 25% and 200 hours

$$\begin{array}{r} 36 \\ 7 \\ \hline 252 \end{array}$$

$$\begin{array}{r} 13 \\ 7 \\ \hline 91 \end{array}$$

$$\begin{array}{r} 61 \\ 52 \end{array} \Big(9100 \Big(60$$

79
20
580
79
9480 lb 420 piston speed

7900
158
7742

.79
2) 3.16
1.58

28
180
224
28
12) 504 (420
48
24
0

9480
420
1896
3792
33000) 3981600 (120.6
33000
6816000
6600000
216000

.80
30
2400

80) 160000 (2000
30
0

7742

24000) 48000 (120 bbl
40000
80

80 Jour

7742
120
15484
7742
929420

118
36

185800 (118
118
590
118
41

2) 118
59
118
41

3716
3900
3300
6330
2640
1260
1180
80

41

118
36
2) 118
59
118
59

100
35
189) 6500 (
189
20

1 bbl 30.500

70
35
350
210
245

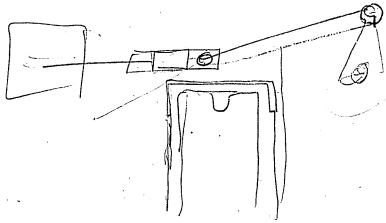
60
40
2400 -
70 -

355
26
2130
710
92.3

92 grms

32
6400
26
384
128
400) 1661 (4 oz 6 lbs
1600

12) 90000 (7500
84
60
60



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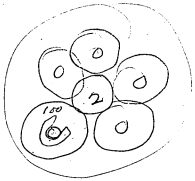


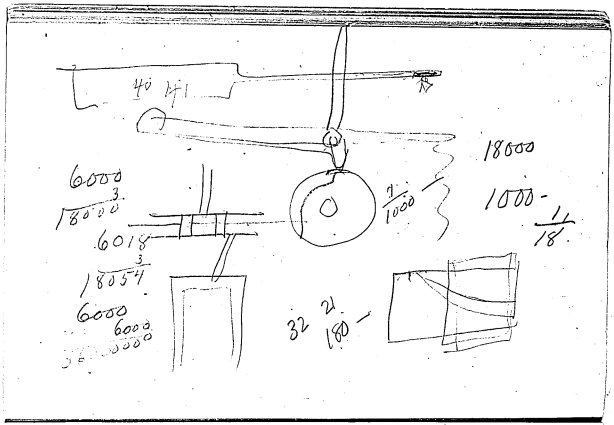
200 Rev min
1000 lbs wt
$\frac{1}{20}$ of wt friction
6" bar Rev 200 Rev.
100 ft per min

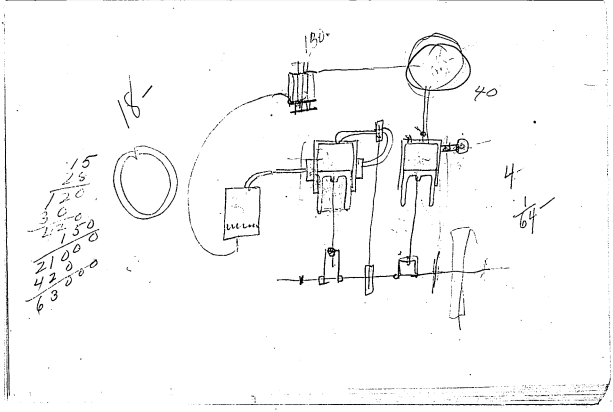
5000 ft lbs
625 "

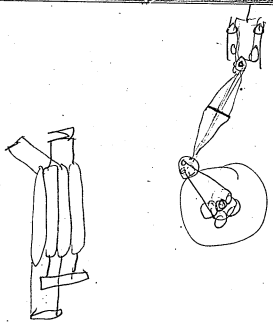
12.5 ft min

12) 150 (12.5
12 0
3
2 40
6

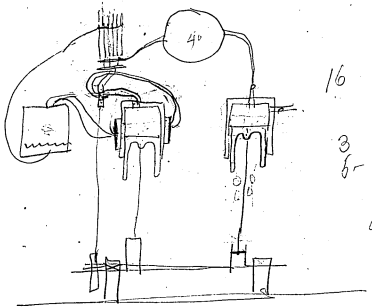
625) 5000 (8
5000


40
18000
6000
3
18000
.6018
3
18054
6000
6000
1/1000
1000 - 1/18
32 2/180


180
40
18
15
15
120
300
2250
1500
2100
4200
63000
4
1/64



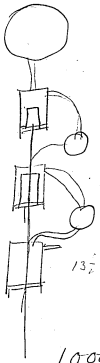
150



16

3

6



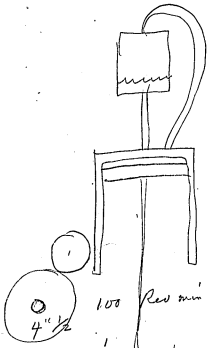
137 lb.

$\frac{1}{20}$ coeff –

1000 lbs –

200 Rad

2" 100 ft min =
50 drag
5000 ft lbs



100 Rev min

4" ½

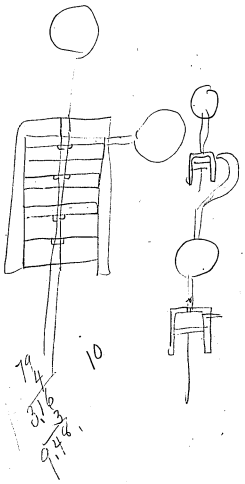
3/4

4/300
12/75 (6 –

100
50
5000

50
6
300 –

16 times less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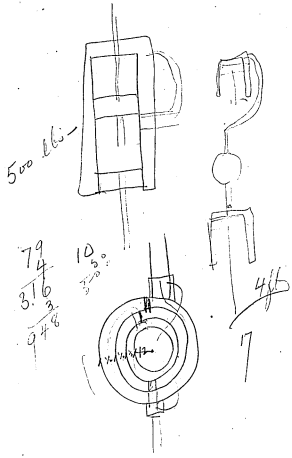

10
7

36 · 8 Cubic feet in

.82 of AH not coded

.67 cubic feet component

28

5

145 - 1728 (123

140.8

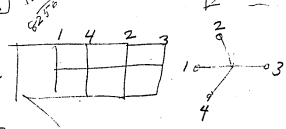
3.20

3.20

4

A .1032

.625



1195

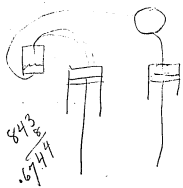
843

352

48

5

B



.10 HA

843

.6744

315

83

40 | 237 (6.90

165

132

33

361

198

163

145

109

36

1728

361

1440

288

144

108

36

5 - 0196 - 165 - 145

10 0361 x33 x44

20 0622 1320 - 109

40 1032 1012 73.51

60 1599 7' 48

1032

625

4404

101

1599

1032

567

70

333

145

567

333

234

189

843

557

286

170

1 | 199/670

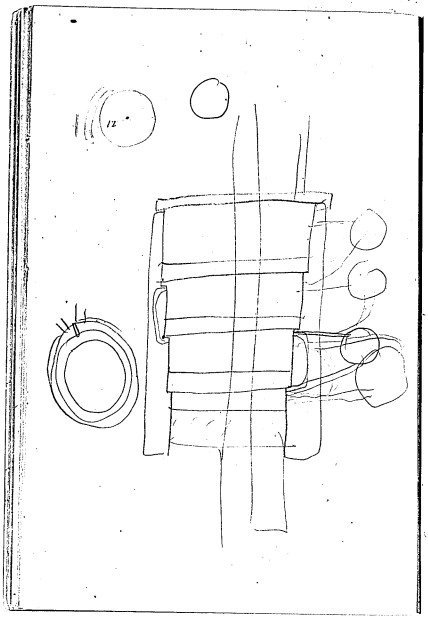
5

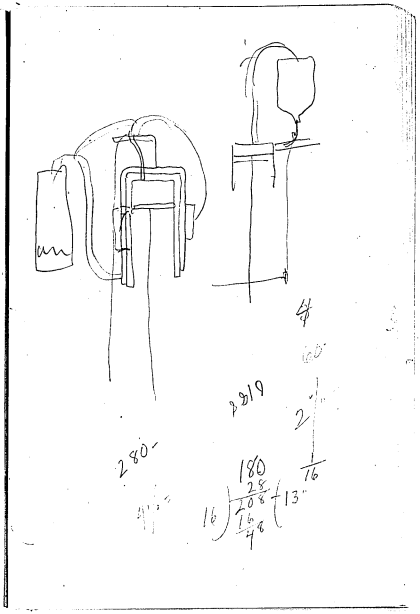
29

82

82

164


12"


4
60
2819
2
280
180
28
16
208
13"
16
16
4
76

60 —

4 / 100000 —
25000 —
60
10

7

25445
60
1527000

1000
225

15000 —
10
9000 —

4 / 13 —
3

3 lbs water
500 deg
3

7500 — 9000 — 16½ / 2 / 147
73

225 / 400000 (1770
225
1750
1750

12 / 1770 (147
16½ — dummy
12
57
48
9
2500

9000 —
1500
6500

.777 / 33000 (40
2996
938
60
500

0 550 amperes —

0 0 025

444
55
2220
2220
2444

25) 1000 (4
444

55
100

5
25
125 — on 97/100 of ohm

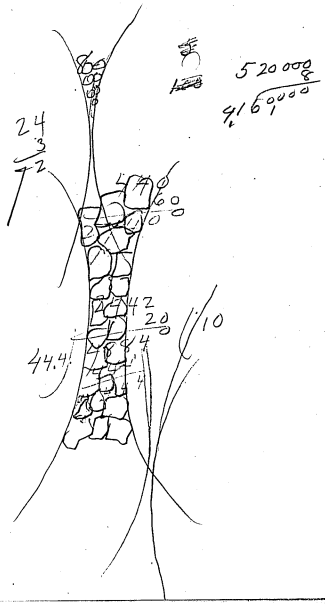
550 Mil amp

or 24.42 ft lbs

loss 2 1/2 per cent —

20 cells 11 amperes —

2 1/2 1/1000 of ohm



16) 172 800 (10800
16
128
128
6

70-66lb

16
12
32
16
192

28
84

1200
12
2400
1200
14412
2880
1440

3 tons
400) 28000 (70

17) 1728 00 (900
1728
0

6) 96 tons
16

8 times

480
400
20480) 192000 (96
1800
120000
120081

1728) 10800 (6.25
10368
4320
3456
864

96
45
141

130
625
650
260
780
8125

62
3
186

45 tons at 4

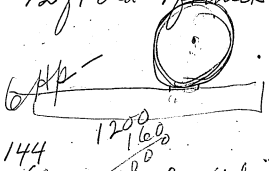
812 lbs 22½ 120 66lb
1624 " 45 ton 240
3248 96 ton 480 66lb
4872 — 141 — 720

1/16
1/8
1/4
3/8

1/2 sp 66

11½
22½
45
96

12 ft dia - 1 ft thick



6 Hp -

144
80
1152

1200
160
1200
1200
1200
1200
1920
19

20 ft dia

115
460
690
460
5290

40,000 -

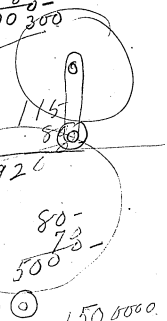
320
480
25600
1280
153600

20
8
160

20
20
400
80
32000

75
80 -
600 300

79 -



115
80
920

5000 -
300
1,500,000

80 -
75 -
500

150 0000.
30

33000) 1500000 (4
13200
18

50% 1/1000 mesh

15 —	500	mesh 1.900.000	2/1000	8
15	200	124.000	5/1000	125
15	100	10.000		
5	80	1000	10/1000	1000
			12/1000	1728

52 million —

all 1/1000 100 million —

50% — 50 "

120,000

8/15 1.9

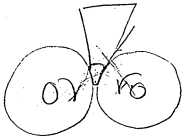
144
12
288
1448
17

125/15 = 8.333 = 1/12

125
125
250
250

60 60

120



79
5000
5

79
50
2 | 385
1675
24
6700
3350
1020

418
60
2000 | 2505 (12/5
2000
5
4000
1080

1/32 —

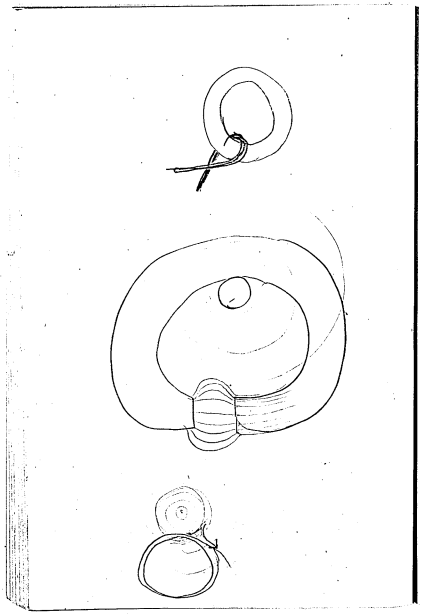
(114 1/8 —

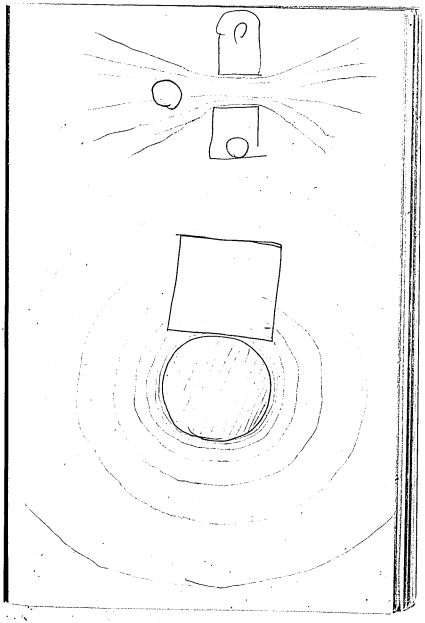
33000 | 3762500
3300
4625
3300
3250
1

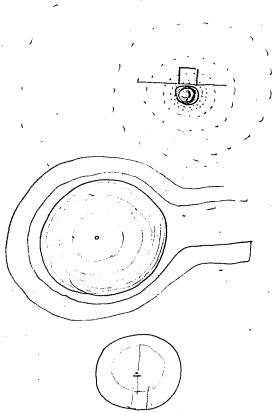
135
31
35
1200 | 405
4183
1

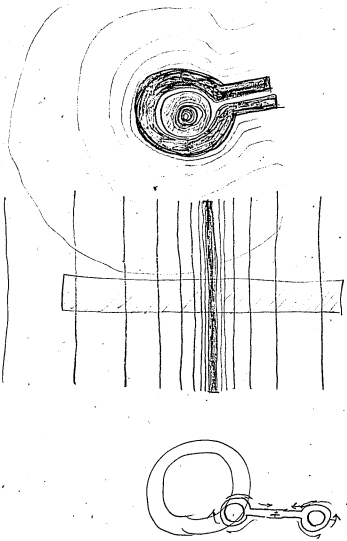
32
12
64
32
384

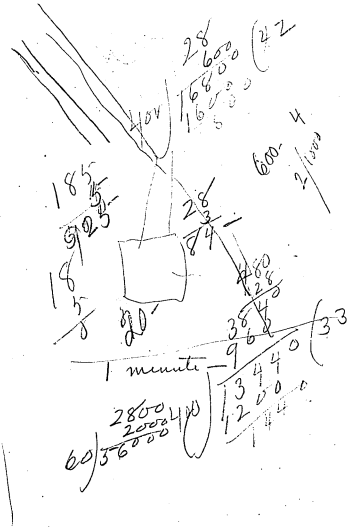
384 | 1200 (3.1
1152
48

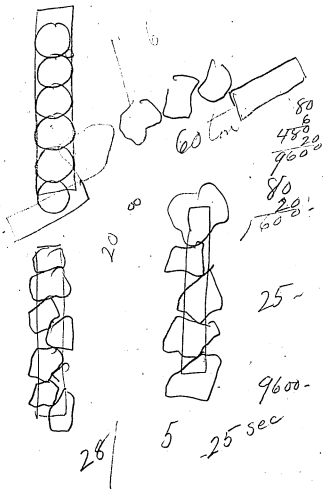









1 minute


60 tons
25 sec

2800 lbs

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2000
168,00
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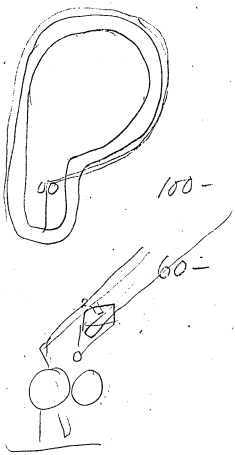
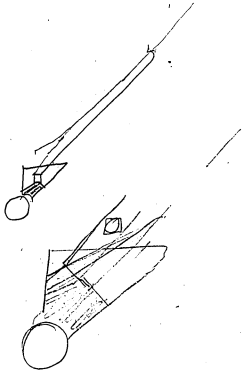
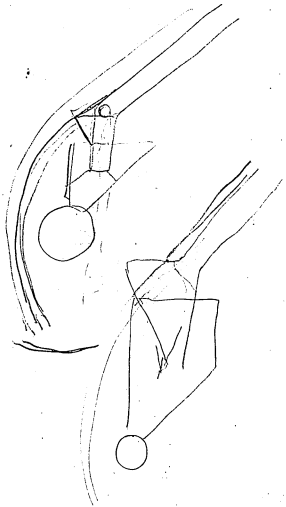
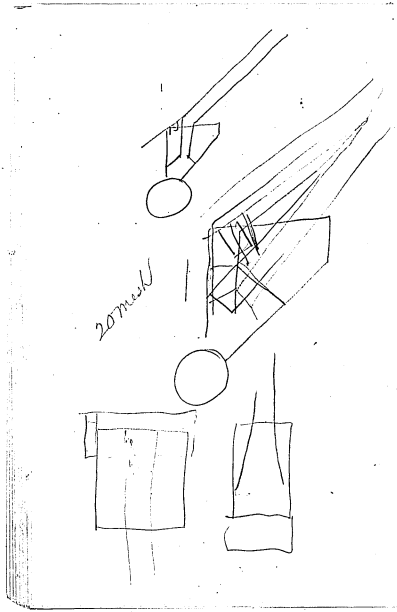
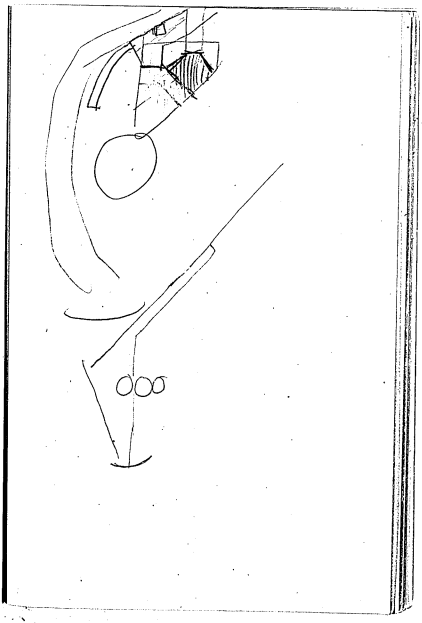
480
480) 2800

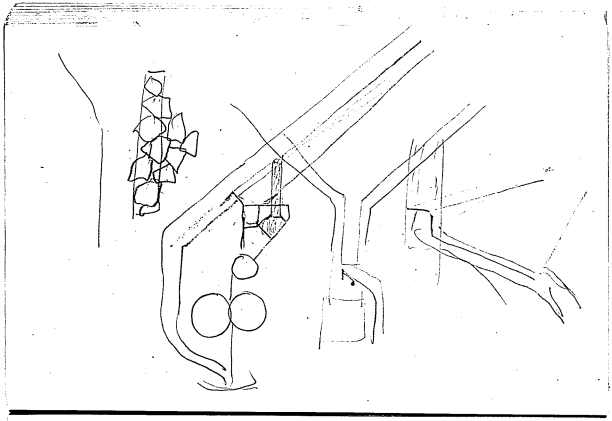


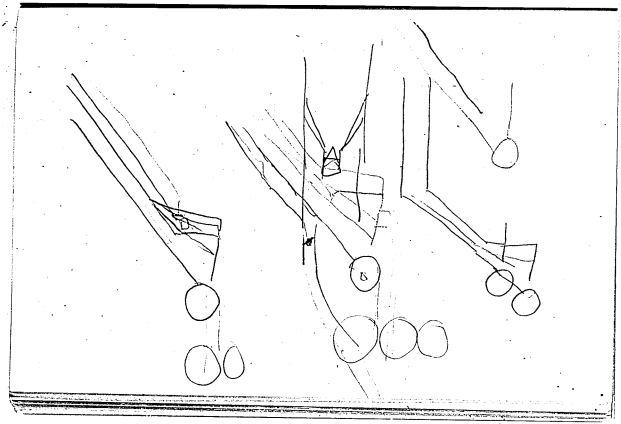


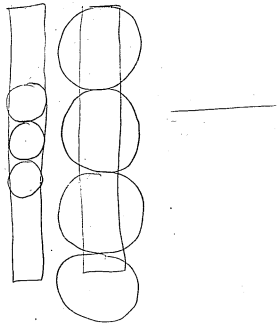


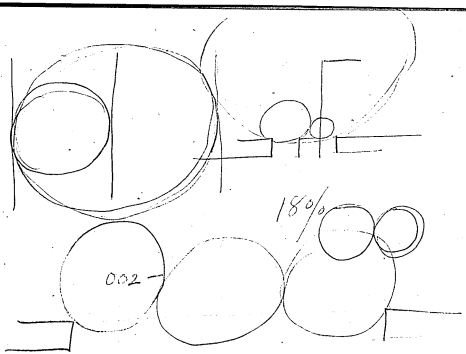

20mm







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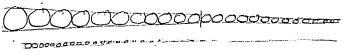

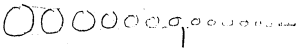

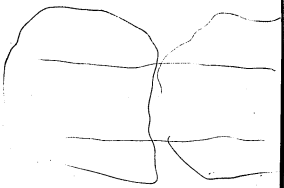

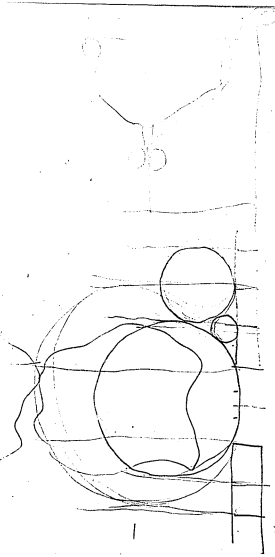

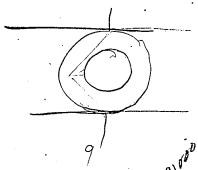
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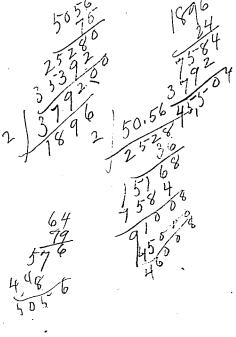
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30
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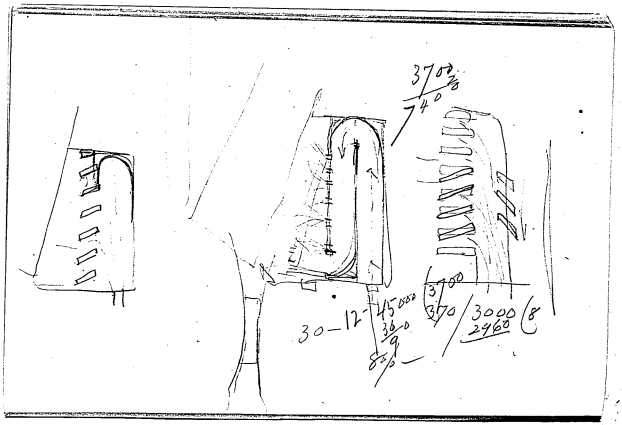
3700
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45000
3600
9
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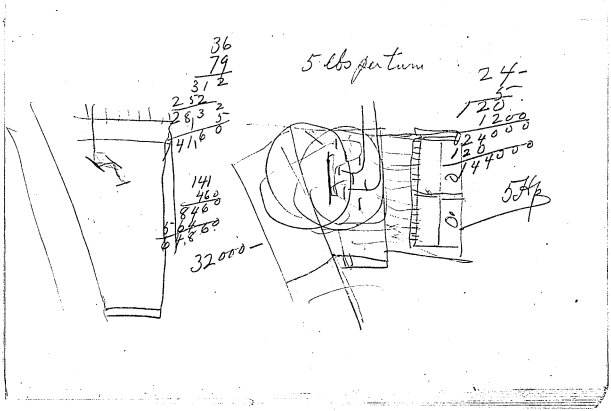
3700
370
3000
2960
8


36
79
312
252
2813
4160
141
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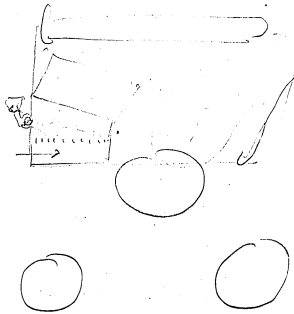
8460
5640
6460
32000
5 lbs per turn
24
5
120
1200
1240000
1200
1440000
5 Hp



CuO Zn

KO + IK solution

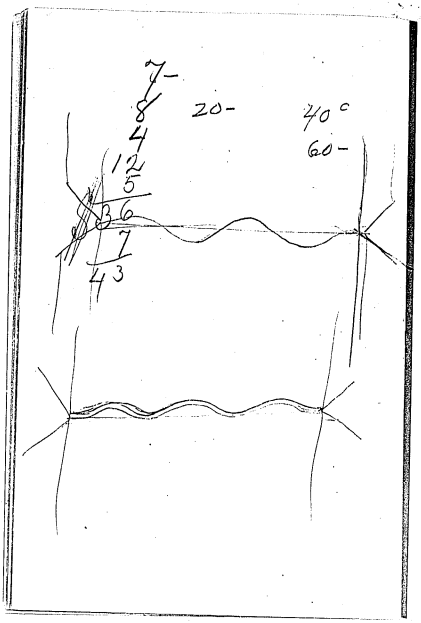
Strange When Cupric Salt

boiling add drop by drop Rebeth

and filter check Cu ppt

Try KCy - strongly

CuO not attacked


7-
8
4
12
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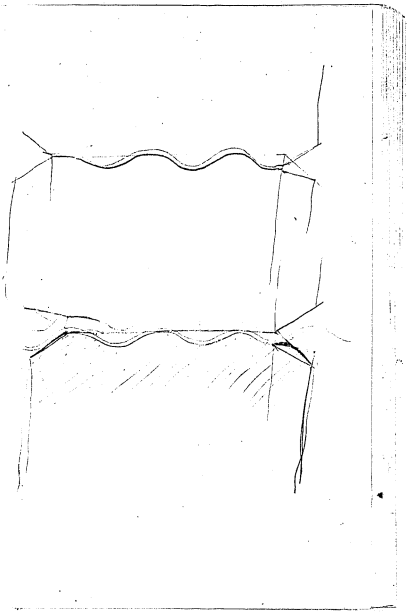
36
7
43
20-
40°
60-



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500
30
1500
1000
750
300
225000
1½ 600 per Apiary

100
66
150000
135000
15000
1½
225000

1.5 / 120 (8
105
15

25
20000
500000
330000
170000
15000
5

15.1. 3 to 1
145.3 - all
125
9
9 - 1125
3000
33000 / 33750 (102
330000
27500
½ 1 1½

25
20000 / 3000
500000
330000
170000
30 / 102 (34
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120

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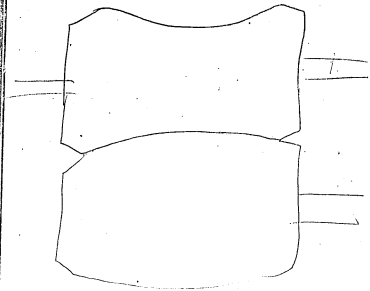
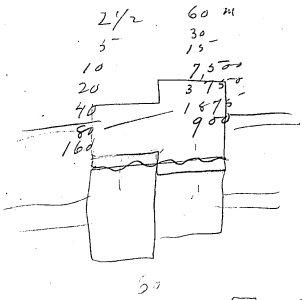
12 / 3000
240
60

250
3 / 60000
1.5
200
30 / 20000
20000
20000

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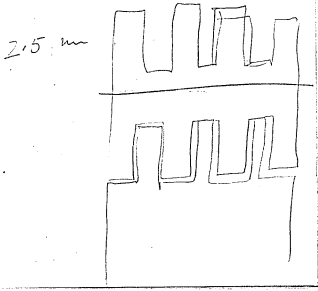
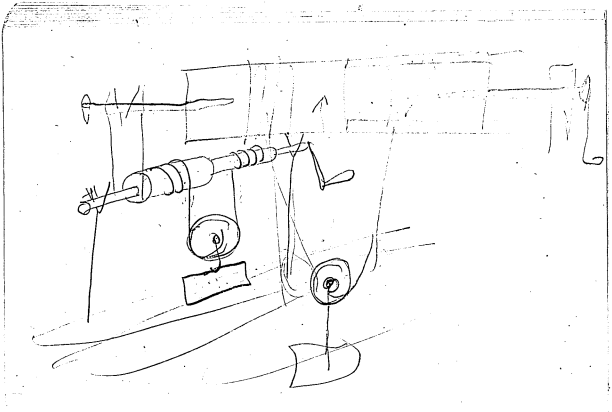
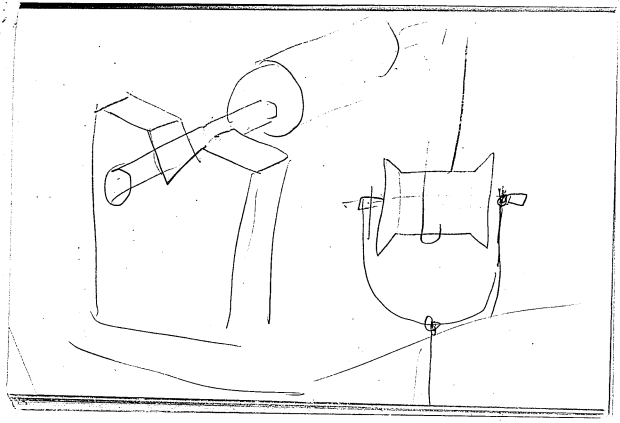
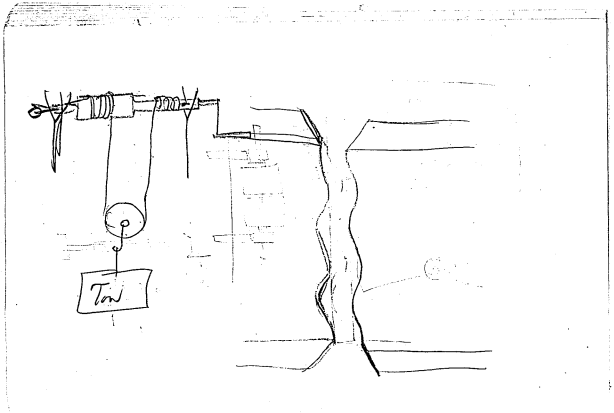
160


2,5 mm



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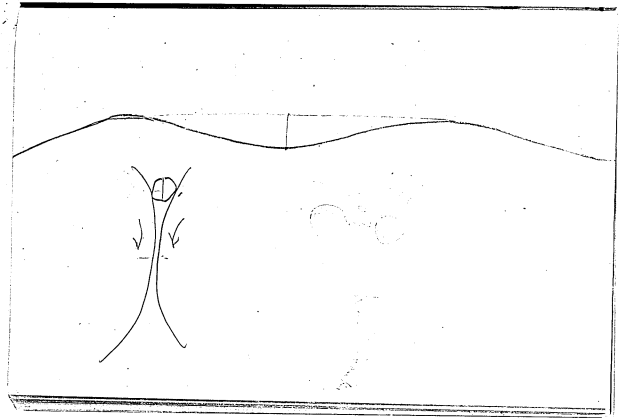

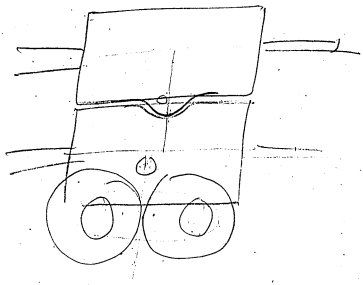

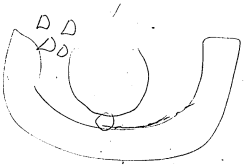

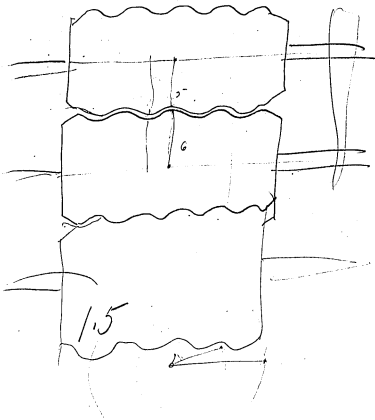
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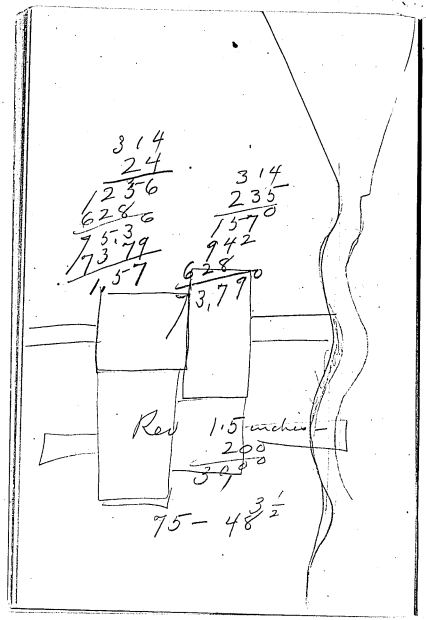
314
24
1256
628
7536
7379
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235
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3,79
Rev 1.5 machine
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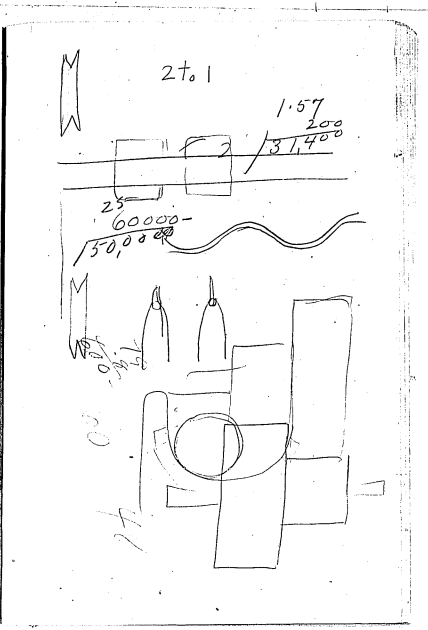
95 – 48 3 1/2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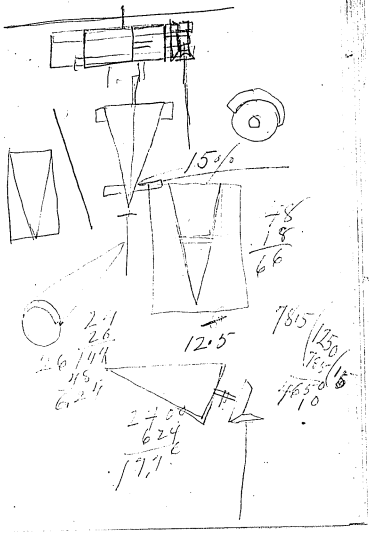
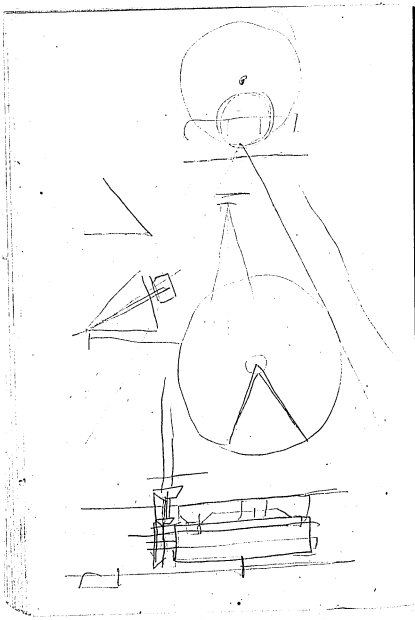
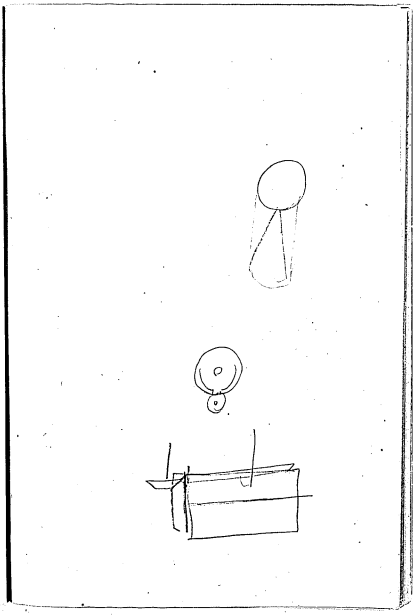
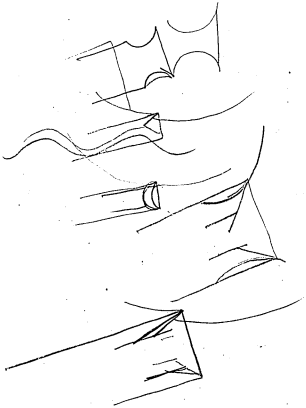
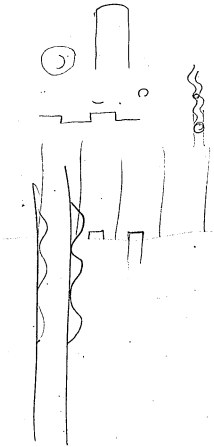
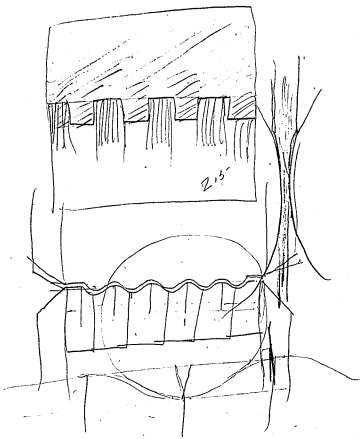

15.5
12.5

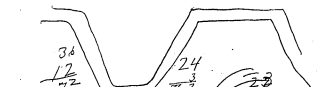












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150 " 91
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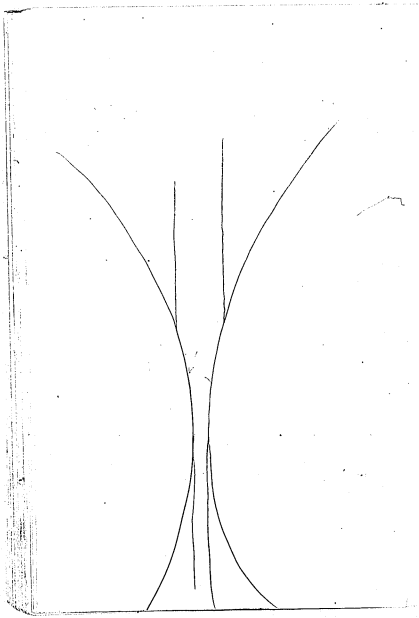
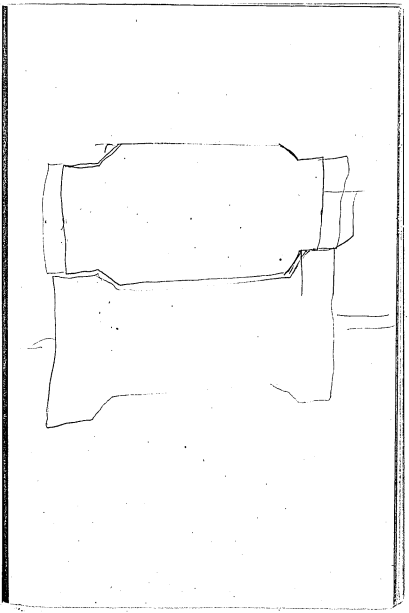
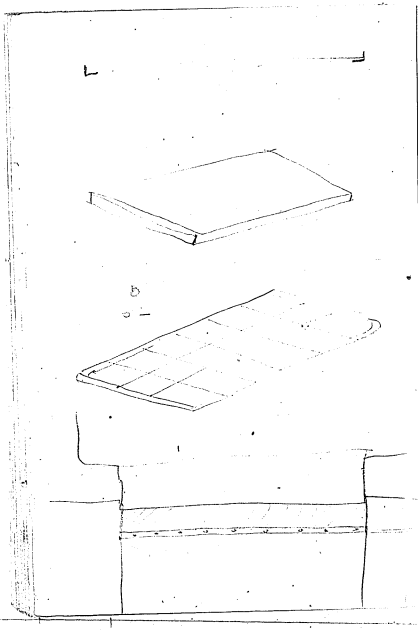
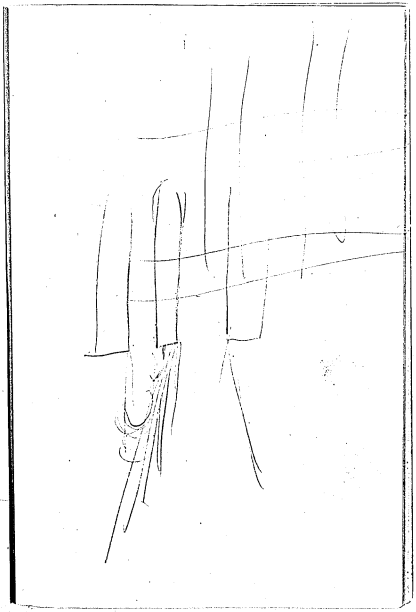
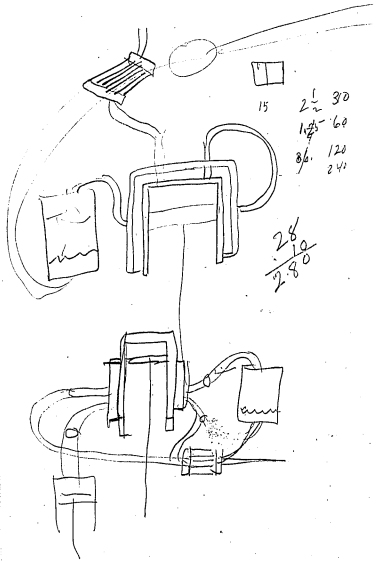










15

$2\frac{1}{2}$ 30

$1\frac{1}{8}$ 60

86. 120

240

28

10

280

160/1728 (10.8

160

1280

62

25

310

124 0

1550

28

62

56

168 6

18 /173

12

36

18

276.

108

28

2/36

10/6.8

10.5 Cube

28

6.8

40

3 27 21

1/4 -

4/300

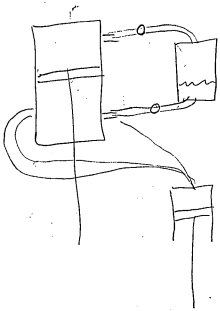
75 inches

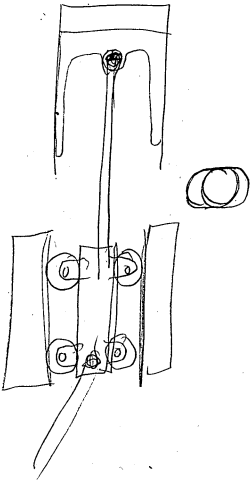
36 36/290 ($\frac{1}{8}$

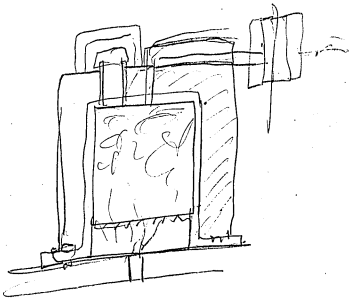
80

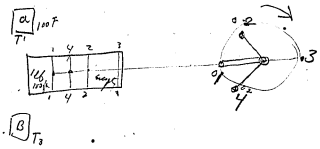
288

36 -



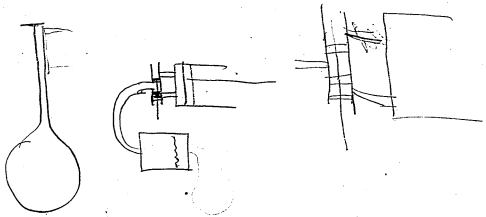






B T_3

11 position press Vol + Temp Equals 1



414 Tons 475 Hp

15000

1300

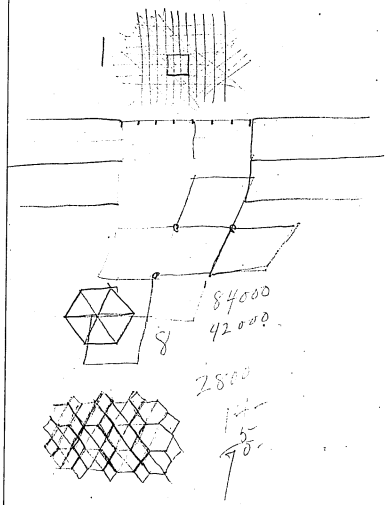
266,666

3,33 000

90
810 —

30

810 — 35
12
620
510
9720
1600
2160
1440
1800
1350
1350
1350



26) 930 (357
78
150
130
200
180
20

150- 400 (26
300
1000

800 (33
3
165

22-24

26
3
84-

24) 2240
216
8

24) 5-50 (2-38
3
7
48
20
22

24

Engineering
Engineering
Engineering

$.75 pair -

75
20
1500
9000.

28
3
84 -

75000 | (.83
72000
30,000

1500
5
7500

125

75 -

7

10

5) 7500
1500
9000.

24
24
96
48
576.00
4605

460
4
1840 -

1840
2
3680
2
36.80

461
15
2305
461
6915
6912
3
10
1726) 6912 (4.
1

20

15 -006
7 003

10 000
40 000
30 000
25 000

800 —
32 00

20 000
5 000
5 000

1200
1800
1350
1125

800

25
60
1500

25

2 — 8c
4 —

10 000, 120 m 1200

40 000 . 12.5
500 250c

12
2 20
24 126

45
25
25
00
1125

25
100 40

15

7

450 25
40
1800 22 6

50 c 12

30c 4.5
30
135

12
2 0
3
2 40
30

1 32
264

172c / 62 880
790
1728 / 50 304
3456
15744
15552

480
29
432
960
9720
13920
9600
4320
13920
2160
11 25
35
600
560
360
3360
392

208
392
75
67

5240

80 | 104800 (1310

80

240 5

240

80

80

1310 ft

1 ft — 80 ft — 4/ft needle

2 160

600 ft —

1100 - 6" 1 ft 1½ deg

2 6

4 - 24 —

5240 · 137 1500 685 137 | 208800 (15

1370

7150

6850

1048 137 ft needed 5240 deg 20 ft 1 ft-ing

5240 6 40

1½ — 80

62840 62500

5240

48 · 2620 250000 (2083 3

5 24

100

96

40

360

4

137 | 260000 (1170

1370

2370

2370

9390

9590

4 ft needed

5240

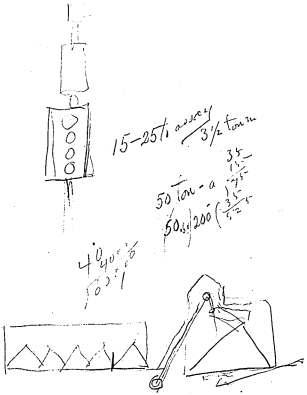
12

0

1048

5240

5240


15–25 ton assist
3½ ton
50 ton - a
50 x 200

Heat-Steam & oil System	3800
for Elevator	4500
Big Load -	3600
25 Houses -	4000
50 Smaller	12000
Furnish Alcide Shaft -	800
Ground	22855
	50705

75000

1600
280
1280
2000
3000
4481

68
7
476
60
416

20

400-

12 Heavy roll shells	2200
Taking out shafts -	200
Grooving shafts -	80
New outboard rings -	25 -
Fixing brings -	
Assembling rolls	200
New plates 1st 36 -	150 -
Fixing Cranes -	800 -
New wheels	
Scrapers - 1200 -	
Shafts -	1200
445 belt -	4000
Rolls, iron 844 -	2000
Change Chute -	
Seperators 2 stock H -	6000
17 Motors -	1560
Ore dock blower	2000
Sand House	1500
Shaker Dryer 1 -	500
Bldg. at 3 H 2	800
	22855

$9034 \times 2 = 18068$

$180 \times 12 = 360$, $180 \times 6 = 1080$, $21\,6$

Jung

$144 \times 80 = 11520$, $36 \times 80 = 2880$, 3450, 414

$36 \times 36 = 216$, $108 \times 6 = 648$, $1036\,8$

$460 \times 2 = 1320$, 880, 1912, 1081, 9037

$1036 \times 36 = 6216$, 3108, 37296

$1728 \overline{)4140}$ (2.35, 3468, 6720, 5760

$1728 \overline{)37296}$ (21.6, 34560, 2736, 1728, 10080

$2.35 \times 460 = 4100$, 1400, 940, 10810

at 2000 lbs pressure 10 square inches area
in front = pressure 16 lbs coal —
[illegible] burns 12 lbs coal —

[illegible]

May 1 lb
[illegible] 068 [illegible]

200 lbs pressure
14 cu ft pressure on 1
[illegible] 1 lb
at 2000 lbs
12 lbs coal —
1

146
140000
56000
140000
140000
576800

1000000
1600000
2600000

35

40
12000
48000
48000
344000

68) 1600 (14
680
3320
3320

50
12000
50000
50000
50000
48000000

3500000

1 8400000
1 6000000
1 3400000
1 8400000
6030000
3600000
3430000

Notebook, N-01-00-00.3

This undated notebook was probably used sometime during the period 1901-1902. Most of the entries are by Edison; some are by an unidentified experimenter. The book contains a list of chemical compounds, mostly organic, with brief descriptions of each compound's physical properties. The number following each entry refers to a key on the first page of the book that provides a set of twenty-one descriptive categories for the substances, including "amorphous," "ductile," "pitchy," "soapy," and "waxy." The spine is labeled "151." The pages are unnumbered. Approximately 60 pages have been used.

N-(01-00-003)

XE-172

Amorphous 1
Gummy 2
Soapy 3
~~Solidness~~ ~~4~~
Waxy 4
Porcelain like 5
Resinous 6
Pitchy 7
Translucent fatty 8
gelatinous 9
Ductile 10
Drawn in threads 12
Amorphous glass 13
Viscid 14
Toughness 15
Transparentness 16
film 17
Varnish 18
Tenacious mass 19

Vitreous 20
flexible 21

Vol. I

Acetate Cadmium Gelatinous
Acetic anhydride acted on by Sul acid Gummy
Aconitate of Silver Amorphous
Aconitate of Calcium Gum
Acrolein Ammonia, Amorphous

Alcoholates
Compound with Chloride Calcium Amorphous

Allantoin,
Compound with mercuric oxide Amorphous

Allophanate of Sodium Gelatinous

Allophanate of Glycerylf Gelatinous

Allylate of Potassium Gelatinous

Allyl Sulphide from Garlic. Glutinous

Amylamine Sulphate Gummy

Aloretic acid Amorphous

Amarine Hydrochlorate transparent mass
Amarine nitrate Amorphous
Amarine acetate [illegible]

Trinitroamarine Amorphous 1

Amygdalic acid, Gummy 2

Amylate of Potassium Soapy 3

Amylmercaptide of Mercury Solid mass 4

Anacardic acid some salts Amorphous 1

Anamirtin Waxy 4

Anchoic acid Porcelain like 5

Anchusin, Amorphous 1

Andaquies Wax – Wax 4

Anemonic acid Amorphous 1

Angelica Wax from Angelica balsam 4

Anise oil, 298 Val, Menthon Gummy Salt 2

Anisic alcohol, converted by Sulphuric acid to Resinous mass 6

Nitroanisoïdène Bromine converts it to Resinous mass 6

Hydride Anisyl, Pentachloride Phosphorus converts it to Pitchy mass 7

Trichloride Antimony, Translucent fatty Mass 8

Pentachloride Antimony absorbs Ammonia, Phosphoretted Hydrogen form solid compounds

Apiin gelatinous — Vitreous after melting 9

Arachis Hypogea Earth nut, oil
Saponified gives hard soap, 3

Aricine, neutral Sulphate, Gelatinous
dries to horny mass 9

Arsenite of Antimony fused to
Vitrous mass, 5

Arsenate Aluminean Vitrous
Mass, 5

Sulpharsenite Tin gummy 2

Sulpharsenate Silver ductile cake 10

Sulpharsenates Tin gummy 2

Asclepione, amorphous 1

Asparatate of Magnesium gummy 2

Athamantin heated with caustic 1
Potash gives amorphous substance

Awade Waxy mass, 4

Azobenzoide white amorphous 1

Azobenzidine, amorphous transparent 1

Azobenzoyl, transparent mass 1

Mecca Balsam, Balsa Gilead
Dragon's blood in threads, 12

Liquidambar transparent 1

Beech bark amorphous substance
obtained therefrom 1

Beechnut oil, soap therefrom 3

Berberine, heated with chromic
acid yields Resin 6

To
538 Vol 1

Benzilin, melts & solidifies amorphous 1

Benzoic acid action of chlorine, tough gummy mass 2

Monobenzoicin - Benzoate of Glycol. 12
at 40° Cent. transparent & drawn out in threads.

Nitrobenzoyl-benzoin, M.P. 137 C solidifies amorphous mass

Benzoylazotide vitrous mass 9/5

Benzoylureid amorphous 1

Berengelite, Berengela Resin, amorphous 1

Betulin, amorphous 1

Borate Lead - monometaborate amorph glass 13

" Dimetaborate amorphous 1

" Sesquimetaborate " 1

Biborate Ethyl — transparent glass, soft and tough, drawn into threads 18

Dibromacetate Lead tough gummy mass 2

Dibromhydrin — action ammonia, amorphous 1

Brucine, action chlorine, amorphous flakes 1

Brunolic acid, pitchy — 7

Bryonitin } amorphous see Bryonin 1
Hydrobryonitin }

Bucurumanga Resin amorphous 1

Caffetannate of Potassium amorphous 1

Sexchloro-camphor. Wax 4

Camphorresin } amorphous 1
Camphoramic acid. transparent, vitreous 5

Camphorimide gummy transparent 2

Camphorin, Camphorate of Glycerylt
Viscid 15

Caproate of Sodium amorphous 1
" Potassium Jelly 9

Caramel
Caramelane
Caramelin
Carmelin } amorphous 1
from Sugar 5 1

Carminfellic acid, earth metal salts 9 gelatine

Casein - cheese - amorphous 1

Cellulose amorphous 1

Ceropic acid, Waxy mass. 4

Cerosin, Wax of sugar Cane 4 Wax

Cerotene action Chlorine, Resin, 6
Transparent

Chloroceriotic acid gum 2

Cetyl-Xanthic acid Zinc salt 9 glutinous

Chelidonate of Calcium amorphous 1

Chelidonine acetate. gummy — 2

Chenocholic acid, amorphous mass 9

Chinoline, action Chlorine Resin — 6
oxdized by Chlorate K & HCl. to tough mass 15

Cholesterin action Iodine, amorphous 1
fatty bodies —

Cholochromic acid amorphous 1

Choloïdic acid, salts Earth Metals amorph 1

Chondrin, gelatinous, 9

Chrysammic acid some salts amorph 1

Chrysamisic acid Cobalt + Copper salts
gelatinous 9

Cinchona Red — amorphous — 1

Hippurate Cinchonine, amorph 1

Cinchonine Chromate amorph ✓ 1
" oxaluratе, Transparent mass

Cinnamein Transparent ss 16

Cinnamene Transparent glass 13

Metacinnamene, highly refractive glass like substance Cut with knife and temp. softens by heat, Wendraum into long threads. ✓ 12

Cinnamic Acid, action Chlorine Tough greasy substance — ✓ 3

Cinnamate of Cinnyl Resinous . 6

Nitrocinnamic Anhydride, Knead able Resin, 6

Cinnamyl Hydride, action Bromine Solid substance.

Citrate Aluminum, gum 2
Citrate Barytamone, gummy mass 2
" Ferric film 17
" Lithia, Amorph limpid, hard, 1 ✓
" Magnesium gummy 2
" Nickel film 17
" Dipotassic amorphous 1

Citrate of Glycerylf. yellow transparent mass difficult to pulverise, insol in Al Ether w H_2O – 16

Citrate of Glycerylf-Basic – Same as above but melts 100 C. 16

Dicitromannitin dry hard mass. 15

Coca – Wax from Cocaine in fr 4

Cocinic acid (cocosteric acid) from Cocoanut oil porcelain like mass, 5

Codeine action Chlorine, amorp Resin 6

Colophene " " Resin 6

Chlorocomenic acid, neutral salts, Mg Cu NHy. amorphous 1

End Vol 1 –

Conine, oxidized to Resinous mass 6 also action Iodine, with Bromine Gummy 2

Conine acetate Varnish 18

Convolvulic acid – Barium salts amorph, diamphorous. Calcium salt. amorph 1

Convolvulin. Transparent Resin 6

Copaiba Resin – in Balsam there is one part amorphous – 1

Copal – amorphous 1

Corticin from bark of the aspen amorph. 1

Creatine action Nitrous acid amorphous 1

Sulphocresylic or Cresylsulphuric acid Lead salt amorphous 1

Crocetin amorphous. 1

Crocoxanthin amorph 1

Croton oil, Saponification, peculiar Resin 6

Crotonol – distillation, Resin – 6

Cubeb Camphor action Nitric acid
Viscid — 14

Cumo-sulphophenamide,
Amorphous Mass, 1

Cumino-Eugenic, Anhydride, Tenacious
Mass 19

Cumylide of Potassium Amorphous
gelatinous, 9

Curarine, horny mass, 9

Cyanide of Cadmium & Copper
Tenacious Mass, 19

Cobalticyanide of Nickel Translucent
Vitreous mass Conchoidal

Ammonia-Cobalticyanide Nickel.
Amorphous 1

Cuprous-cyanides of Copper Amorph!

Ferrocyanide Tin gelatinous 9 ✓
" Zinc " 9 ✓

Ferricyanide Potassium, acid in sul acid — certain stage, Tough substance 15

Platinocyanide Potassium action Nitric acid Jelly — Sulphuric acid Tenacious Mass 15

Cyclamin gelatinous amorphous insoluble translucent glutinous — 9

Tricymylamine Chlorophalinate Viscous 14

Daphnin Lead compound gelatinous 9

Delphinine Sulphate Transparent mass acetic precip gelatinous like Alumina 9

Diffluan Vitreous transparent 20

Digitasolin Amorphous Mass 1

Doppelerite, pitch, 7

Dragons Blood amorphous acid resin, 6

Dulcisulphuric acid Barium Salt,
transparent Gum — ditto Calcium Salt

Dystysin — amorphous — 1

Elemi — Resin, NH4 Cmonts. to
gelatinous mass, 9

Erythrosin amorphous — 1

Ethyl Hydride, amorphous Mass 1

Ethyl Selenhydrate, mucic salt,
easily fusible amorphous — 1

Sulphethylate Copper Gelatinous 9/9
" Gold "

Ethylamine hydrochloride amorph Mass

Bromide Vinyl — Bromoethylene
percelain 5

Ethylene oxysulphydrate forms . 9
Crystalline Salts which at 100°C gelatinous

Euchroate of Silver. gelatinous, 9

Eugenates. Basic Pb Salt. Tenacious
Magnesium Salt. Amorphous 1

Eupione. Caoutchouc dissolved leaves
dry varnish — 18

Euxanthate Silver, gelatinous. 9

Euxanthate of Ammonia gives with
Cupric Salts a Jelly 9

Bromeuxanthic acid Amorphous E
The Salts are gelatinous S 9

Chloreuxanthic acid Salts gelatinous

Nitroeuxanthic acid Salts mostly
gelatinous — 9

Fibrin — gelatinous 9

Filicic acid amorphous, 1
Na salt, amorph gummy - 2

Filimelisi-sulphuric acid, Barium
Salt amorphous — 1

Filipelosic acid - amorphous 1

Chlorofilipelosic acid amorphous 1

Formate Tin gelatinous - ✓ 9

Uranic formate, glutinous mass, ✓ 9

Fraxin amorphous — 1

Fumarimide transparent Resinous Mass 6

Furfurine - Tough Coherent Mass 15

Furfurine Phosphate gummy mass 2

Gallotanic acid amorphous after 1
Evap - trans - vitreous, friable, 6 ✓
Bromine forms a resin - Nitric acid
amorphous

Gallolanate of Antimony gelatinous 9
from Salt. gelatinous, 1 4

Garcinia Mangostana, Resin, 6
Trans amorphous —

Gaultherilene, nitric acid forms
Resinous substances, Chlorine &
Bromine Viscid substances, 14

Gelatin - action Chlorine flakes
filaments, Elastic, 12

Geoceric acid Waxy acid - 4
from lignite,

Glass amorphous, 1

Apoglucic acid amorphous 1

Quinovin-Sugar amorphous 1

Glutin amorph - vegitable gelatin
yellowish limpid liquid when hydrated
Consistence Varnish, Cambe drawn
into threads having silky lustre
12

Glycerolartrate Calcium, glass 13

Epichlorhydrin action NH4 gummy mass, 2

Glycocholic acid Ag salt gelatinous
Na salt, amorphous 1

Nitrosacchrate of Pb, gummy 2

Glycyrrhizin amorphous. 1

Glyoxal amorph mass. 1

Guaiaretic acid, pentachlor Phos
gives Tenacious resinous mass, 15

Guanine amorphous 1
Sulphate, hard mass

Oxyguanine. amorph gelatinous 9

Gums

Haematoxylin - amorphous 1

Harmaline Sulphite, Resin — 6

Dichloroharmine, NH4 throws 9
down jelly -

Benzo-helicin, Gelatinous pulp 9

Bromo-helicin, amorph — 1

Hevene, from distillation Rubber; action
Chlorine forms Wax — 4

Hydracroleic acid amorphous — 1

Hexyl — Chlorine makes Viscid substance 14

Sulphohippuric Acid, amorphous 1

Cerotic acid Waxy 4

Melissic Acid waxy 4

Argyrescin under Horse Chestnut,
gummy Mass — 2

Humopic acid amorphous, 1

Hydracrylic acid Ag salt, amorphous 1

Hydrides of alcohol radicals, higher series. will doubtless be found to be solid waxes - 4

Ceratene Waxy 4 under hydrocarbons
Melissene, Waxy 4

Hydrocarotin, after fusion amorphous 1

Hydrocinnamide, after fusion.
Transp amorph mass like gum - 2

Quinhydrone in Ntly amorphous Wax 1

Ethyl-Carbohydroquinonic acid
Lead salt amorphous 1

Hyocholoïdic acid Resinous
Sodium salt, in alcohol perfectly
transparent Varnish 18

Imasatin action Kott, gelatinous 9

Inosic acid aq salt, gelatinous 9
like Alumina,

Ipecuanic acid amorphous - 1

Isethionic acid Potassium salt.
fibrous porcelain like mass — 5

Isodiglycol-ethylenic acid
Copper salt, amorphous — 1

Isoprene, from Rubber, Ozone
converts to amorphous Mass, 1

Jalapic acid. The salts are 1
amorphous ? ? as well as the acid

Jalapin - amorphous Resin 1

Jalapinolate Copper amorphous 1
" Ammonium - Jelly 9
Lead amorph. 1

Lac, amorphous 1

Acetolactate Barium gum, 2
pulverizable, Copper salt amorph
gummy

Sulpholactate Lead amorphous

Methyl-lactate Silver amorphous
gummy Mass 2

Lauric acid Wax — 4
Lead salt, amorphous 1
Na salt Opaque jelly 9

Lecanoric acid Calcium salt
gelatinous — 9

Diamylene-Lepidine Resembles
Paraffine 4

Triphenyl-leucaniline brittle
non-basic resin — 6

Leucate of Ammonia, amorph
Lead Salt Resin
K salt, a soap 3

Isomaleic acid Lead Salt amorphous, 1

Malate Aluminum transparent
gum — 2 Ba salt amorph
Copper salt. gummy mass 2
Iron salt gummy
Lead Salt, transparent pitchy mass 2,
also amorphous 1

Maltha, mineral tallow, 4

Mandelic acid melts to gum — 2
with HCl. becomes amorph — 1
Potassium Salt White soft easily friable
Soapy Mass 5, 5 3

Mangostin. amorphous Mass. 1

Mannitic acid gummy Mass 2
Copper salt, amorphous 1

Margaric acid Ba salt amorph 1

Marrubian – amorphous 1

Meconic acid Cu salt, gelatinous
K neutral salt, uncrystalle – 9

Melanic acid like lamp black.

Menthol action Sodium.
Nitrous transparent Mass 13

Menyanthin. amorphous friable 1

Mercury phosphide may be cut
with knife – 10

Telluride methyl Nitrate transparent amorphous 1

Methyl-dithionic acid Nickel Salt amorphous - 1

Methylenitan amorphous, 1

Permolybdic Phosphate, tenacious transparent mass. 15

Permolybdic Tartrate, amorp 1

Sulphomolybdates Cerous Salt gummy 2 Pb salt amorph 1
Magnesium Salt, Varnish 18
Manganese Salt transparent Varnish

Morindin gelatinous - 9

Morphine acetate. Varnish — 18
Cyanurate, amorphous. Hypurate.
Amorphous Mass! Malliate, amorp Grittle, 1
Pyrotartrate, fissured gum — 2
Sulphate. Amorp 1

Iodomorphine achinitly amorphous!
Hydriodate decomp aq CO_2 amorphous 1

Myconelic acid transparent, Metallescence 9

Myrtle wax 4
Myricin, wop in Beeswax Insol. alcol 4

Myristic acid Lead salt, amorp — 1

Myristic anhydride, amorph — 1

Myroxocarpin trans glass 3
Chlorine Compounds to Resin 6

End 3rd vol

Phtalic Amorphous substance 1
action of Chloride of Sulphur on
drying oils

Tetrachloride of Dibromochloronaphthalene
If heated above its M.P. remains soft
transparent + amorphous 1

Bromotrichloronaphthalene B modifcn 4
Wax like, another modfcn Wax like

Hexachloronaphthalene
Wax like 4

Chloronaphthalic acid, lead salt
gelatinous 9

Marignacs Trinitronaphthalene
addition resinous substance 6

Napthionic acid
action Nitric acid containing Nitrous a
a Resin — 6

Napthalamine, chlorine forms
Resin — 6

Menapthylamine Sulphate amorphous

Narcoline Sulphate Viscid, 14
hardens gradually

Nithialin amorphous, action Sulfide
ammonia on paranitraniline —

Dinitrethylic acid see Nitro,
Magnesium Salt amorphous

Ceric oxide dis. in Nitric acid on evap viscid mass, 14 ✓

Nitrate Zirconium, basic salt Gelatinous — 9

Nitrosacharose, white trans translucent gum in cold but gelatinous, sopy at ord temp — 9 ✓ 12

Oil Nutmegs, deposits solid Camphor, absorbs 11% HCl & melts to a transparent mass. 16 ✓

Ocuba Wax — used extensively in Brazil for Candles — 4

Oleamide Ostin Alcoholic NH4 in Oil Almonds, Semitrans at 75 possibly good for phono nursing — 4 ✓

Oleate Chromium amorphous 1

Tribromo-dioleic acid forms
unemulsified Salts, Ba Salt pitchy 3

Oleate Mannityl
Colorless, waxy mass, becomes soft &
tenacious at gentle heat - 12

Cod liver oil treated alcoholic NH4
forms large quantity of fat amide
MP 93 C becomes solid & trans, 1
perhaps all the oils will give amides
when treated with alcoholic ammonia,

Olivil, a Resin, Trans 6

Onospin amorphous 1

Opianic acid ammonium salt amorph 1

Sulphopianic acid trans amorphous Mass

Opiamsmone, amorphous — 1

~~Octobia~~ Otoba fat Contains ~~Oc~~ Otobite which when slowly heated solidifies amorphous 1

Oxalate Aluminum amorphous transparent mass — 1

Oxalate Vanadium Blue gum 2 translucent,

Potassic Vanadic Oxalate amorphous Varnish — 18

Dimethoxalic acid gummy mass 2

Diazobenzene-oxybenzoic acid —
action NH_4 + HCl, amorphous sub 1
Zinc salt amorp — 1 Copper salt ditto 1

Dioxybenzoic acid
action Nitrous fumes, Resinous Mass 6

Oxynaphthylamine, amorphous 1
perfect —

Oxyquinine Colorless Crystals
mass when fused — 16

10 palmitic acid 90 lauric acid
uncrystalized 1
50 palmitic 50 lauric uncrystalized —
35 palmitic 65 Myristic acid, uncrystalized
32.5 " 67.5 " "
30 " 70 " "
20 80 " "

Palmitic acid — Pb salt amorp 1
Ag salt highly amorph ✓

Mannitic Palmitate sol) white
Mass melts to a wax → 4

Palm Wax Hot alcohol separate
it into a true wax + a Resin 4 ✓

Parabenzine action H_2SO_4 —
forms acid Ba salt gummy 2

Parellic acid, gelatenous 19

14 ✓

Pasto Resin — Viscid capable being
extended in very Tenacious fibres
which gradually harden
When heated above 100 C. becomes
elastic like rubber →

Pectin amorphous 1
Parapectin " 1
Pectic acid in moist state jelly — 9
Dries to trans horny mass
Pectates except alkali insol H_2O —
gelatinous 9

Peloaine amorph trans Varnish 18

Peucedanin — waxy mass 4
its from the Masterwort

Chromous Picrate amorphous 1

Bromamidophenyl — several
amorphous products — 1

Aniline & Sulphide Carbon is
converted in a few days into a
fatty substance — 4

Aniline Melaphosphate Amorphous 1

Cyanilide, under Azodichlorophenylamine 6
Resin, resembles Copaiba perfectly

Diallylidene-diphenyl-diamine-
Varnish 18

Dibenzylidene-diphenyl-diamine,
amorphous also & glassy sub 13

Melaniline-hydrochlorate a
gum — actinchlorine a Resin 6
Oxalate, a Resin — 6

Phenyl-amyl-actinchlorine
Viscid Juice — 14

Under Phenyl-Benzoyl-
Benzhydrolic-Sulfonate,
transparent amorphous — 1

Phloretic acid – action chlorine
sticky mass – 14

Nitrophloretin, amorphous 1

Phlorizein, unsyllgble – 1

phlorizin – HCl – cannot to amorphous
Chlorine to a resin, 6

Phosphoramides 1 amorphous

Hypophosphite Aluminum –
Thick gum when evap in Vac
Dries to shiny gummy brittle mass, 2
ditto glucinum salt, 2

Orthophosphate Aluminum acid
Oxalt gummy – fuses to glass

Metaphosphate Lead fuses to a glass 13
Hexametaphosphate Lead
precipitate which becomes 6 resinous

Hexametaphosphate Magnesium
precip. soft & tenacious ammon. Mg phos
Dried to brittle trans mass, 16

Metaphos of Silver melts to a glass
insol H_2O — 13
Hexmetaphos aq. soft at 102 C & higher
temp. melts to glass insol H_2O
13

Tetrametaphos Sodium
precip gummy even when diluted
100 times, when precip. by
alcohol mass is rapy. like 12
Rubber Dried to trans pliable
mass not hygroscopic

Phosphate-Tantalic acid
fuses to colorless glass 13

Phosphate Titanium gummy 2

Phosphato-Vanadic acid
Varnish — 18 ✓

Orthophosphate Di Zincic salt,
with Trans glass. mol H_2O. 13

Phosphate Zirconium gummy 2
translucent mass. when dry
mol H_2O —

Ethylphosphoric acid Uranic salt
amorphous brittle, 1 ✓

Physalin — amorphous — 1

Picoline action Chlorine — 1
dazzling amorphous powder ✓

Propionate of Sodium amorphous ✓

Prussian Blue amorphous

Pertannic acid, amorphous 1

Pyrocamphretic acid — Camphretic acid salts amorphly Gbl
pyro salts Ba + Pb, amorph — 1

Pyromeconate Magnesium amorph
Ag salt, gelatinous — 9

Pyrophosphamates of NH4 + K
gummy 2

Pyrophosphotriamic acid,
amorphous 1

Pyroracemic acid B kind
from amorphous and gummy 2
salts —

Pyrotartaric acid Magnesium 2
Salt, gummy very friable mass

Pyrotartrimide, dis PbO xide,
Dries to gummy mass, 2
Calcium attack filter paper
resides it gelatinous viscous 9-1-14

End Val 1V Watts

Regular —

Quassin Trans yellow brittle mass

Quercetamide amorphous 1

Quercetin alcoholic Sol mixed
with Ferric Chloride amorphous
Mass 1

Quercitron = Nitrogenerite
Amorphous Resin — 6

Quercitrin after fusion amorphous

Quinic Acid, after fusion Amorphous 1

Quinates Yttrium Salt gummy
Ferric Salt gummy 2

Quinine Dihydrate Resinous 6
acetate fuses to colorless glass 13
√ Borate a Varnish — Chlorate a
transparent Varnish — √ 18
Croconate or Rhodizonate of Quinine
Amorphous, 1 Cyanurates Amorphous 1
Hydroiodate Melts to a Resin — 6
√ Nitrate Waxy? √ Tannate Amorphous 1
Valerate, solid free from solution as
a glass — √ 13

Hydroquinine Amorphous Resin √ 6

Ethylquinine Amorphous 1

Quinine sulphuricacid Solid amorphous 1

Quinone precip with basic acetate Lead gelatinous V. 9

Quinonic acid forms unemployable salts - 1

Quinotannic acid, when mixed with gallotannic acid dries to transparent varnish — 18

Quinovin - amorphous resembles gum 2

Racemate of Nickel, gelatinous 9
Magnesium salt amorphous 1
when combined with alkali metal no double salt, 1

Ethyl Racemocarbonate one modification amorphous trang mass 13

Rhamnocathartin amorphous brittle 1

Rhamnotannic acid amorphous, 1

Ricinelaïdic acid, Ba Salt unctious to touch, taley. 3

Ricinelaïdin, solid fatty body action Nitrogen peroxide on Castor Oil. 4

Ricinoleic acid - fatty acid. Calcium salt fuses to solid - very fraible - Lead salt fuses to solid whose Easily pulverizable

Rosolic acid, pitch, amorphous. 7

Rubiacic acid amorphous 1

Rubian, Hard perfectly amorphous resembling dried varnish or gum Arabic 18

Rubichloric acid Lead Salt transparent Mass - 13

Rufimoric acid Amorphous 1

Rutin fused to amorphous mass 1

Saccharic acid brittle mass
Ferrous Salt quinuny ✓ 2

Salep 1 part of salep converts 48 parts of boiling water into mucilaginous compound & valid addition of magnesia or borax ?

Chlorosalicin Resinous - 6

Salicylic anhydride, hard mass

Salicylide fused to translucent mass 13

Bromosulphosalicylol Resinous mass 6

Monochlorosalicyenin Resin 6

Salicetin Resinous - 6
acids separate it from H_2O as gelatinous pulp - 9

Salvia, Sage oil - Nitric a Converts to a Resin 6

Sambucus, soft gelatinous resin 14 which may be used as a bird lime

Santonin by prolonged fusion amorphous 1

Trichlorosantonin, alkalis Convert to Resin 6

Saponin Neutral Pb acetate, gives gelatinous precip - 9 ✓

Sassafras Oil H_2SO_4 forms Resin 6

Spomaeic acid, under Sebacic precip formed by Spomate of ammonia & Chl Calcium amorphous 1

Selenicyanate of Mag. amorphous gumming Wax 2

Selenium Tetrachloride one reaction gives mass resembling Wax 5 4

Sleevals Nickel transparent glass amorphous, 13

Sleevals Manganese transparent glass amorphous 13

Sleevals Lithia brittle transparent glass amorphous - 13

Selenite of aluminum trans gummy mass. Cerium salt. Varnish - 18 2

Ag salt. Opaque mass

Zinc acid salt trans gummy fissured mass - 2

Myristin, silky aspect, fm Beeswax 4

Shellac Varnish - 18

Silicate Soda, gelatinous, forms tough skins - 17 9

Silicofluorides - Mg salt trans gummy mass - 2 ✓ ✓

Silver Sulphide amorph, waxy 10
✓ Cut with knife - dilute Chloride

Up to page 300 Vol V

Artificial argentic Sulphide after fusion - soft enough to cut with knife 10

Sinaxinus - resinous when heated in oil bath 6

Sinapic acid easily forms soluble
Salts with alkalies sparingly with
Earths and other metallic oxides

Aqueous solution of sinapine
Amorphous residue 1

Sulphocyanate of sinapine -
melts - solidifies gummy mass 2

Sulphocyanate of sinapine with
iodine heated leaves resin 6

Sodammonium - spongy tufts

Solanicine - amorphous 1

Salts of Solanidine - the sulphate
Amorphous 1

Solanine solution in acids exp. by alkali
white gelatinous precipitate 9
melts then solidifies amorphous mass 1
with nitric acid - resinous 6
Salts of Solanine dissolve in alcohol
gelatinous mass 9
Chlorate of Solanine - Amorphous 1

Selenic heated sealed tube with Ethylic iodide salts gummy 2
Opalate with Amorphous salt - 1 Selenic

Page 438 Part V
Sulphate of Aluminum - Amorphous powder 1

Succinate of Lead - Basic salt ✓
Sticky - Glutinous! Brittle on cooling

Green scum from sugarcane has peculiar wax called Cerosic - 4

Sulpho - Benzoic acid - Amorphous!

Sulpho - Camphoric acid - lead salt
Amorphous! - Barium salt ✓
gummy - 2

Van Uric acid - Calcium salt gummy 2 ✓

Sulpho - Cinnamic acid - Silver salt
amorphous - 1

Cromo - diammonio - sulpho - cyanic acid
Amorphous 1

Sulphoglutinic acid - action of sulphuric anhydride in excess of naphthalene glutinous 9

Sulpho-melanuric acid
Sl. ~~[illegible]~~ salt - large plates - easily [illegible]

Sulpho-naphthalene - multi 90 - solidifies intumescent - electric by friction.

~~Methyl-sulphurous~~

Methyl-sulphurous - basic lead salt - white amorphous - 1

Naphthylthionamic amorphous treated with nitrate of potassium bromide resinous 6

Chloronaphthylsulphurous acid multi - milky crystalline mass

Trichloronaphthylsulphurous acid
Amorphical cupric salt
filiminlry jelly 9

9

✓ Tetrachloronaphthylsulphurous acid - potassium salt gelatinous mass

Ethylene sulphurous acid - Lead salt
Tough gummy mass - ✓ 2

Naphthylene sulphite of ~~Aluminum~~
Barium salt - amorphous - ✓ 1

Menylene - sulphurous acid - Barium
salt - amorphous - 1

Sulphato-acetic opide - gummy mass - ✓ 2

Sulphate of Aluminum - tetra-basic salt
transparent vitreous fracture
transparent jelly when wet. 9 ✓

Manganic sulphate perfectly
amorphous powder. 1

Tellurium

Sulphate of tellurium fuses to
transparent vitreous mass. 16

Vanadious sulphate - basic salt dirty
sea blue transparent mass. 16

Amyl sulphate are generally crystallizable and are soapy to the touch 3

Amyl sulphate of aluminum - gelatinous 9

Calcium salt - soft to the touch - 3 ✓

Mercuric salt crystalline nodules ✓

soapy and glutinous 9 ✓

Ethyl - sulphuric acid - aluminum salt

Gummy ✓ 2

Lysocerylic alcohol after being strongly heated solidifies to a tiles - painted glass - 13

Lycoretin amorphous 1

Lybric acid melts to glassy mass 13

Lead salt amorphous - easy fusible

Magnesium salt transparent resin

Lylinoleic acid - amorphous mass 1

Lyltonin muscle fibre gelatinous 9

Common Lilac leaves have a waxy 4
substance extracted by Ether

Pomaspidic acid amorphous mass 1

Rufitannic acid amorphous 1

Tartrate of lead - gelatinous mass 9 ✓

Tartrate of sodium - gummy mass 2 ✓

Aluminum salt - gummy non deliquescent 2 ✓
mass

Acid tartrate of Potassium dissolves
Alumina forms in an amorphous mass
Bi-potassic tartrate white
amorphous mass 1 ✓

Meta tartaric acid transparent ✓
gummy mass 2

Glyco tartaric acid black amor-
phous mass ✓ 1

Diaceto tartaric acid transparent
gummy mass 2 ✓

Accto tartaric solu action of sodium gives a transparent gummy substance - 2 V

Amyl tartaric acid barium salt amorphous - V 1

Citra tartaric acid transparent amorphous mass - V 10

Tellurous acid
Tellurite of cadmium gelatinous dries to a brittle mass having a conchoidal fracture 13
Lead salt melts to a translucent mass
Tellurate of potassium Soft gummy coagulum - 27

Terebamic acid - barium salt a gum 2

Ruben tellic acid - Lead salt resembles gum arabic - 2

Chloride thallium - crystalline flexible mass 21

Theobromin - dissolves in baryta
water to a white jelly when solid. 9

Arsenic solidifies to amorphous state
Iodic lead salt amorphous 1

Thymol absorbs ammonia gives
hard brittle mass at 100. can be
drawn into threads - 12 ✓

Thymotic acid - White loosely
coherent mass silky lustre melts
at 180 expands & solidifies

Stannic acid gelatinous 9 dries to
hard translucent lumps like gum
arabic ✓ 2

Stannate of ammonia gelatinous 9 ✓
Meta stannate of Potassium gelatinous 9 ✓

Tungstat of aluminum acid salt cindy
yellowish lumps when dry 6
viscous mass colloidal fraction ✓

Meta tungstic acid colloidal
gelatinous 9 sticky gummy - 2 ✓
Some meta stannates are amorphous

Acid quinine 2 ✓

Albumin salt amorphous 1 ✓

Prune salt – amorphous 1

Iron salt – very dirty ✓

Magnesic sulphide combines with barium, calcium, strontium, ✓

Magnesium sulphide to form amorphous mass 1 ✓

Nitrotyrosine barium salt amorphous 1

Nitrate of Ammonia acid salt amorphous 1

Nitrate of lead – amorphous 1

Nitrate of potassium amorphous

Nitrate of sodium forces to amorphous varnish like mass 1.8

Veratrol potassium salt gelatinous chlorine acts to make mass 3

Rescin glutinous constituent of the matter too. Pure rescin is a body substance may be drawn ✓

[illegible] in Number ✓

Oleo-capric a fat obtained in [illegible] by boiling a species of [illegible] kelp, consistence thus to [illegible] adhesive elastic membrane like [illegible] 17

Rubine the hydrate in an amorphous colloid varnish 18

Mucomic acid neutral quinic salt amorphous – most of the salts are amorphous 1

End of Vol V

Sulphomolybdates – Gumming amorphous 2

all correct

W Bay Foth

185
15
1850
15
120) 333 (2
240
93
84
90
9
180
1750

Notebook, N-05-01-02

This undated notebook was probably used sometime during the period 1901-1903, although it may have been used as early as 1900. All entries are by Edison. The book contains notes and drawings regarding ore surveys, assays, and ore separation experiments. Included are entries pertaining to the search for nickel and cobalt in the Sudbury district of Ontario, Canada, and in Litchfield County, Connecticut, for use in Edison's storage battery. Other items relate to separation tests on iron ore from the Dunderland region of Norway. The pages are unnumbered. Approximately 20 pages have been used.

XE-172 N-(05-01-02)

Ryan Ore. Sudbury Township

Miller 24 –
Lot 8 Con 3 Southern Land
prospect No 3 taken across pit 3 ft
below surface – probably 2 % Copper
No Nickel. ½ % Cobalt probably
or more

No 33 Ryan Lot 8 Conc 4
Sample from shaft dump about 0.12
Copper No Nickel or Cobalt

No 22 Lot 8 Con 3 Sample taken
from Quartz Vein in pit No 2
Nearly all pyrite – Nitt Sol yellow
green – No Cu or Ni or Co
but blending with Hydrozincite gives very
yellow – test for platinum etc –

No 25 Ryan Lot 8 Conc 3 Southern Land
prospect pit No 2 Taken across
pit = Nitt Sol comes yellow
Acid Chromate of K = No Ni Co or Cu
Test for Platinic – Hydrozincite
Nitt Change Color

No 26 Ryan Lot 8 Con 3
Northern end taken across outcrop
on Line 0 125 ft North.
Nitric Solution Reddish (Green) —
Nickel Nitl Sol. greenish 0.2 Copper
No Nickel — Hydroxyl — Sol little
yellowish —

29 Ryan Lot 8 Con 3
North end across showing
on line 80 South
Nitric Solution Reddish Nitl Sol yellow
Hydroxyl — Sol yellow —
no Ni Co ? ~~Lost~~ ~~plot~~ etc
No Ni or Cu

28 Ryan - Lot 8 Con 3
N end taken across showing
on Line 32 N 80' from base
line - ~~[illegible]~~ Nitl Sol greenish
Hydroxyl yellow No Cu or Ni

27 Ryan Lot 8 Con 3
Pit No 2 S dead from bottom
3 ft below surface 3 ft wide —
difficult to [illegible] the opening
Mostly pyrite — HCl HNO3 used
badly — Copper ably 2%
Ni or Co = Hydroxylam / yellow

31 Ryan - Graham Lot 8 Con 3
South lead Pit No 1 sample
across bottom 10 ft below
surface 7 ft wide —
perhaps 2% Cop Ni

33 Barnetto property Graham
Lot 7 Con 3 from dumps of
shaft 200 ft E of Ryan's property
on North block in Ryan's group
012 Copper Ni

(No 32 Mullen)

Ryan – Lot 8 Con 3 N. Land
Acres showing on Line
32 S 90 ft from base line –
Nitsol beautifully clean green
What does it's ? – No Ni –
Hydrozincite yellow solution –

30 Ryan Graham Lot 8 Con 3
South Lead Pit No 3 from
small stringers of ore
Cop 2 @ 12½ oz – The
ore at least / one % of
Nickel

Y Langhammer Little Rock Ark
No platinum –

~~S C Wing~~ A B Gordon
Sudbury pyrite ~~Bi Selfid~~
No Ni or Cop –

Ellers Property

No 34 – Water Lot 10 Con 2
~~adjoining~~ No 2 — Nat Sol yellow
No Ni or Copper –

N side of O'Connor's Claim
Nat Sol yellow No Ni or Cu –

Tailing from outcrop Vicinity –
O'Connors Claim – Nat Sol
yellow – No Ni or Cu

S side O'Connors claim
Nat Sol yellow No Ni or Cu

g a Boim
Dan Tran —
got his other Teller 20 lb box ore
little Cu — No platinum —

John T Hubbard Counsellor
Law Litchfield Con
Calco & pyrrhotite mixed 1/2 bulk
gang at least 1 1/2 % nickel
& 1 % Cop — Diorite —
good —

No 35 (M 22) Ollier Property
Water Lot 9 Con 4
2 ft across showing
on Lane 9 — 1/4 to 1/2 % Ni

analysis Co .77 Ni+Co .80 - Copper .25

Miller 14 Litchfield Nickel —

Strong Copper + probably 1 to 2%
Nickel — got Hydroxylamine test —

analysis Cu .14 Ni+Co — 0.182
Litchfield
Miller 12 — Say 1% Cu + 1/2% or less Nickel — proportion of Cu to Ni about same as 14 but quantity 1/4 or 1/8% —

analysis Cop .07 Ni+Co 1.70 Copper .20
1/3 gangue nickel
Miller 10 — Litchfield
Very strong Cu + Ni —
was short of Hydroxylamine
1 1/2% Ni I think — Very good ore
~~[illegible]~~

Miller 8 — 1/4 of Cu ~~[illegible]~~ Cant see any Ni — Analysis Cop .055 Ni .087

Miller 10 Litchfield trace Cu
Analysis Copper .039 Ni .050

Mu[illegible]

Muller 11 - 1/4 % Cu etc. trace Ni
Y. Ulmik —
Analysis Cu .063 Ni .050

Muller 9 - No Cu etc
Anylsis Cop .047 Ni .036

No 6 - Muller Trace Cu etc
Reg anylsis - .051 Copper .037 Nickel.

Muller 5 Strong Cu etc
2% or more. — Calcanadella
Ni 1/2 % Y. Ulmik — Anylsis Copper
1.71 NiCo 1.17 Copper 0.10
1/2 gangue in black —

Analysis Cu 0.59 NiCo .34

Muller 13 flask busted
NiCu 2 ds & over —
Sand ubent 1/4 of it — 1/4 to 1/2 % Dark

No 2 Dunderland Hem Crude not Conc treated Saturated Sulphurous acid in Water 48 hours — .0954 Phos

No 3 Dunderland Crude not Conc — 1/2 % H_2SO_4 — 60 hours — same solution 5 times bulk of ore in Cup .0028 Phos

XB Same Reg powdered good Ni green Soaked in ~~Hot~~ KOH 20% then Ethyl & poured off & put mushy on filter paper & dried — it was ~~clumpy~~ 942 to test swell — Good grid Cake too thin —

AX = Reg powdered Ni green soaked 3 hours 20% KOH pressed in cloth —

I put a lot washed Dundeland Mag & Hem mixed in Tea Saucer with 100 cc of 1/2 % HCl solution did not use all HCl put in 5 pm yesterday 2nd

Mag & Hem mixed.

No 4 Dundeland
1/2 % Sol HCl - 5 times bulk of material with Washed Crude Dundeland This sample taken out after being in C.C. solution 3½ hours
.160 Phos -

No 5 Dundeland Sample Taken 2 hour & 35 minutes after No 4 or 7 hours + 50 minutes from the start, -
.135 Phos

No 6. Dundeland ~~Sam~~ Sample Taken 17 hours after No 5, or 25 hours after the start,
.152 Phos

No 7 Is a new lot of Washed Dundeland Crude with both Mag & Hem - put in flat Saucer with ~~[illegible]~~ 100 cc 1/2 % Sol HCl. 17 hours. 84 grammes Ore, This would be about 14 lbs HCl to ton ore
.147 phos -

Apparently HCl NG
Reports or is allowed
up. doesn't run
Smoothly passes
the apparatus

No 8 Dundaland Same as No 4
but sample taken out after
37 hours soaking in solution —
.133

No 9 - Sample 50 hours after
soaking in same solution
.147

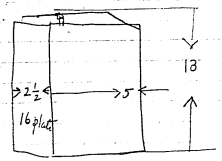
No 10 last run of No 4 ½ % HCl -
62 Hours in same solution 9
doesn't get any precip with HCl only but
put nitric in & heated, then no
change —
.188 Reports Evidently

II Dundaland Crude washed
was in weak Sl. soy for one
week about don't know how
strong acid was think it was
.0021 10% but only 2 or 3 times
back of that —
.0056

12 – Dundeland Cone made by Lehman – Hematite, about 1/4 lb – put in Lunge Berl. & 2½ liters bulk of 1/2 % H_2SO_4 – put in 30 hours, shaken about 3 times, 10 washed – .0038

13 – 100 grams Hematite Cone made by Lehman gbly .030 – put in pendulum tube, 100 cc of 1/2 % H_2SO_4 solution passed through several times, one portion in all input. about 20 hours total time, 10 washed –

Briquette made by glass new process, about a maximum 17 % of water –



Req cell-

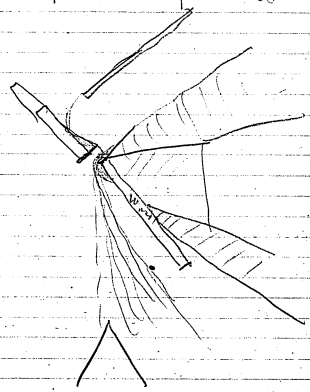
Miller

15	Prospect not [illegible] Specimen [illegible] not [illegible] [illegible] [illegible] [illegible] [illegible] Lichfield	.072	Ni
16	Prospect not [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]	.53	Co .10
17	[illegible]	.355	
18	[illegible]	.029	
19	on road between [illegible] not [illegible] [illegible] [illegible]	.029	
20	Not Tom [illegible]	.007	
21	Prospect not [illegible] Samples from [illegible]	.021	
22	[illegible]	.014	
23	[illegible]	.029	
24	[illegible]	.63	Co .20
25	[illegible]	.20	
26	PT [illegible]	.05	

Sock 23 [illegible] glass - it is apparently a Diorite or green rock but although today there is no trace of pyrites,

No 24 about 1/4 of the rock is pyrohotite -

A quick run by myself of Wrand.
15/1000 oz. saved from 2 ton lot reshipped
back to London by Dehwan
I arranged the Picaquet department



I first run it through once
Took the Tails & run them

3 times.

No 14 is the final Tails being The first Tails rerun ~~twice~~ (3) ~~again~~ times again — 16.88 —

15. Concentrate rerun 2nd time, .048
16 = " 3rd " 0.39
17 " 4 " 0.40
18 " 5 " 0.37
19 " 6 " 0.36
20 " 7 " 0.37
21 " 8 " 0.38
22 " 9 " 0.34
23 " 10 " 0.33

24 Is all the first tails, and all the tails from each rerun of Conc all mixed together + is the total tails that will go to dump — 22.85#

25 Is Nickel deposit Blackbird Mining dist Lemhi Co. near Salmon Idaho given By Gross Bro 624 State St Salt Lake City. it is a white shiloe clay like dark stuff full of apparently white specks.

25 Columbia Glossy alleged to show
4% Ni 13% Cobalt, & 2.90 Au
another 11% Ni 1.8 Cobalt,
1.8 Cop & $3. gold —
A Rough test by Nat shows no
nickel but apparently strong
Cobalt which may mask nickel,
& Cop — See Letter to Day
from Victor Heiker filed in
Nickel Box — pyrite after
Concentration & wash is now
Magnetic. There is 5% of magnetic
Thingy

No 26 =

Sample sent from Hampton
of Columbia Mines Co. placer Oregon
said to contain 20% nickel.
There is lots pyrites in it, tried
with Nitric + Nat. no nickel,
its glassy & looks like other ones.
lots Ni — may be Uranium or
something else. Its Curious —
Hallington says over 6% Ni
Ry Little Co — only Sulphide in Oregon
Regia — will give 2% to 3% soon —
DVD

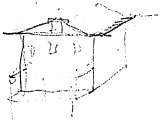
No 26 Silica 7.74 %
Metallic Fe 28.31 %
Alumina 3.26
Metallic Nickel Co 6.58 %
Lime 5.66
Magnesia 4.20
Sulphur 36.98

Very slight Soluble in warm Nitric Sol in hot Aqua Reg
its & Cornwall Mineral C —

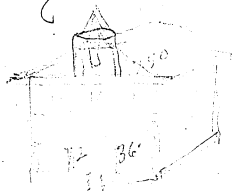
27 This is from Ray from Mine in S E Maine & Connecticut with letter of Mr Parker — It Cop mine owned by Boston parties. It Nickel-bearing Pyrites.
Ni + Co = 3.187 % =

Notebook, N-01-04-01

This undated notebook was probably used sometime during the period 1901-1904, although the entries at the end of the book may have been added at a later date. All entries are by Edison. The book contains notes and drawings regarding storage battery experiments, including a list of possible explanations for low power output from the cells and a set of cost calculations for a competitor's automobile battery. There are also entries describing various methods for electrochemically extracting silver from nickel-cobalt ores. Near the end of the book are several drawings that could be preliminary sketches for Edison's concrete houses. The front cover is labeled "Very Important." The pages are unnumbered, and several pages have been removed from the book. Approximately 140 pages have been used.



Battery



Probable Causes of low Amp efficiency

1st = Some impurity in solution which is oxdzd & circulates & is reduced within the solution thus absorbing amp & doing work within the liquid probably as heat; I wonder if this would require any voltage. Could we have a large amp & scarcely any voltage & thus fool ourselves with Zn Zn & SulZn, there may be large amperage & scarcely any voltage,

2nd There may be some solid impurity in MnO_2 or Fe_2O that is oxdzd & reduced absorbing amperage (?) having work done on it — giving back nothing

3rd In the poss. of the Electrodes H may be free or absorb O requiring an amperage to give O but this is not nitric free to show growing but combines with the H in the water or vice versa O in the water H set free by C combines to form water

4th: The early growing of the iron may represent nearly the whole loss of Chromium

5th: Peroxide of Hydrogen may be formed in the Nickel & Cobalt ~~etc~~

6th

½ of the current may be used to form gas within the porous material. As this gas is meant on discharging

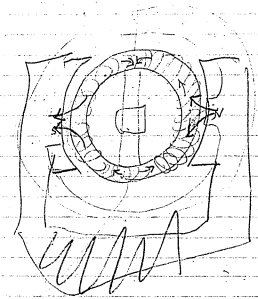
7th It is possible there is a local action between MnO_2 + the graphite, + ½ is reduced while ½ oxidized resulting in a local heating internally –

8th Iron dissolved in solution is plated over while charging - this requires amperage + it does not go back - This must be entirely too small to account for any practical loss

X

9th When Iron is reduced an impurity causes local action + undoes 1/2 that is reduced ⊙ redoes it, taking place only when current is reducing. When no current gas polarizes reduced iron + prevents further loss of charge - or standing. If this is true then the Oxalate must be got pure.

Why does Jiva Iron continue growing in KOH after taken from furnace run - it may be hydrogen but it is probably a reducing action of some impurity or an oxdyl action -



May be H_2O_2
acts as reducer

10th = If the loss was due to gassing on the iron while there is no gassing for 100 to 200 Mah on Nickel the pot on discharg there was 50% loss of amperage. This can be explained that the 50% loss is by Iron gassing because the iron is good for 1200 Mah after Nickel goes to .75 V. This looks as if it was in the Nickel & that the very sensitive NiO_2 was continuously reduced while being charged by either organic matter, or ether means. If so what is perhaps there is an impurity in the nickel that reduces it or the acid radical in solution decomposes NiO_2 to NiO as fast or rather ½ as fast as formed. Acid decomposes Ni_2O_3 to NiO always. In this case the

Radicals would reduce to NiO + give free O, or radicals would reduce the Ni_2O_3 not yet NiO_2 - + thus require more C to bring it back to Ni_2O_3 so it could be revived —

It is possible that there are still some salts in Ni giving residuals. There is certainly 1½% of Cobalt + some platinum platinum forms platinates, so in alkali + also Cobalt, both act as acid residuals. It looks very much as if the trouble was in the Nickel —

possibly NiO_2 is combined with K acting as an acid —

11 One thing seems to be certain + that is if there is a voltage of 160 across the cell + 100 ma during charge + 1000 mah goes in under these conditions, The discharge

of cell will represent a certain amount & the balance can only be accounted for by
1st gas
2nd Heating of cell & in no other way

12. If a 1200 Iron fully charged is placed with a Nickel discharged then on charging for say 200 Mah with 100 ma flooding - The Nickel will receive that amount of charge the energy loss will be large on the iron but not on the Nickel now on discharge we should get 200 Mah because the iron has great capacity yet we only get 100 Mah back. Therefore it is almost certain that the trouble lies with the Nickel where is it - or in the solution within or around the Nickel either in chg or dischg

My impression is that it has something to do with Colloidal nature of $Ni_2O_3H_2$ I think Black Ni_2O_3 would be better than the green oxide for orientation & it possibly may give more uniformity for grain & less swell — CO_2 have never tried it, with 100 Rollings & H_2 = also the thickness of the grid may have something to do with it =

B = Since a nickel charged odd way with platina as one for years 750 to Volt & 900 to 30 & yrs same nickel only gives about 375 @ 400 to Volt when placed close to an iron possibly the free H from ionizing of Iron reduces the outside layers of Ni_2O_3 at holes continuously & thus a large amount of charge wasted — be lost This can be proved by changing them apart & running them alone. Longitudinal or edge charge as free H would not only take from it but effect the plate

In our little tests we stopped at .75 V
I noticed as the total charge increased
the voltage ran down more gradual
perhaps. If we had run further down
would have shown better results.

14 = It may have something to do
with the guessing needs I am
almost convinced that a good
part of the worthy of a Ni grid
is due to formation of a + its
inability to get out through the
viscous hydrate KOH + and when the
NiO_2H_2 is previously at the KOH
+ Fe$_2$O$_3$ produced out = when mixed
in grid - swell is reduced to practically
15 = It may be a concentration problem
in charging all KOH is thrown out
of the Ni grid = Later looks this way

Ni_2O_3 40.67% of Ox

NiO 54.23% " Ext

13.56% of O Capacity

Fe to Fe_2O 14.28% Ox

Fe to Fe_2O should give 7 amphours for 7 gramme Cake

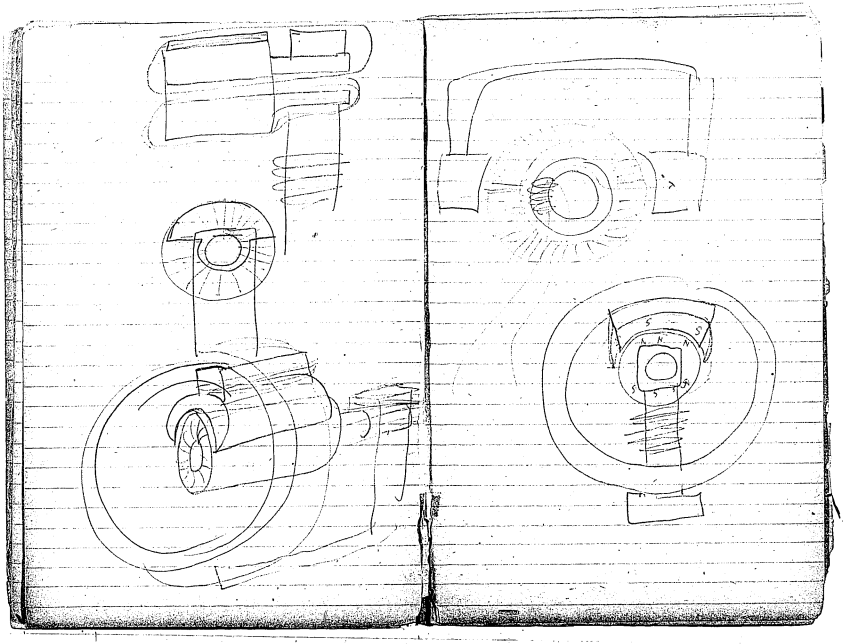
of 3500 amphours for 7 gram Cake if at 4020 to Fe_2O.

No grafite

A 7 gram Nickel Cake should give from Ni_2O_3 to NiO_2

about 3000 mahours

Ext No graf Ni_2O_3 anhydrous


S
N
N
S
S
S
R

25

24

1 coll 3.76
3.4
25

250 — 2 "
3

125

59
446 | 200
1784
216 | 4

4.4

475 — 6000
1900
950
100 —

83 | 200
66
17
9.6

25 | 1500
10
250
45

5

60 160 —

17.

51

24 | 900
16 | 350
8 | 550
4 | 0 | 6
4 | 0 | 6

51
306

6000

24 | 900
14 | 350
9
1 | 0 | 0
7 | 3 | 4

500
1500
1350
150

Weight of Sealed cell top + bottom 18 oz

Each 4.3 cake Nickel plate 180 grams
Grid alone 40
Cupsaline 40
Iron plates of gram Cake plate complete 250 gms
Water absorbed in each plate 25% 30 grms
Liquid per plate
Space for each plate 160/1000
Space between 40/1000 after swell
3" cell 18 plates,
3 Cube inches liquid to plate (h.p.)
Each Ni plate ~~[illegible]~~ 144 hours to Volt,
" Fe 28.8 " " "

~~50~~ Ni plates per HPH —
~~25~~ Fe "

Ni plates 20.3
Fe " 14
4 cells — 4.5
Water absorbed 5
Liquid KOH — 10
53.8

11½ lbs of Ni grid matter 7 lbs metallic Ni

50 Ni 4.5 — 9250 grms } 43.10
50 Fe 5 — 10.000
5 20 plate cells 7½ lbs — 7.50
Carnelian 3 lbs — 3.00
50 Ni plate above 4300 grms
50 Fe " 4000 — } 18.60
2.75 lbs — 24 13.75
650 to vault 85.9

20) 100.00 (5
86 lb
57 lbs Nickel hour
185
50
925

100. lb —
3.8) 140 (37.
114
26
45
360
44
120
72
48
166
3.8) 620 (
55
9
1
2.75
37.3
54.00
55.
4.31
163.
141
80
146
134
46
166
860
55
5
50
100
5
4.45) 192.50
141
142
133
9
1.68
21
60
746
44
46
46
44
2
1.861
276
276
55
7
1
29) 7
1.31
55 mark
12
9
1
2.86
24
124
140
20
1
86
173
30
143
37
166
120
46
74
2) 31
159
166
3.8
190
120
70
2) 31
159

Cheapest French auto battery (Heinz.)

44 Cells Costs in factory 900 francs or $11 per hph 20 amp discharge 140 ampere hours. Sell To Consumers 1250 to 1400 mean of which is $16. per hph 1st Renewal P plate at 150 full discharges $56. 2nd renewal 11 second $56 - at the end the plates are gone — Total 450 discharges Cost to Customer after 1st renewal $19.40 phh 2nd renewal $22.80. phh or 83 cents per charge — no salvage =

255. 1½ years 450 disch 22.80 per hph $16. HP hour —

512
255
257

280
44
120
120
1120
1120
123
88
35
32
3

280 Watts

280 watts

12320
1120
1120

44-watt hour
1 cell.

1400
280

16.

392 | 12320
16 | 392
32
64
0

12320
746
8960
4480
4

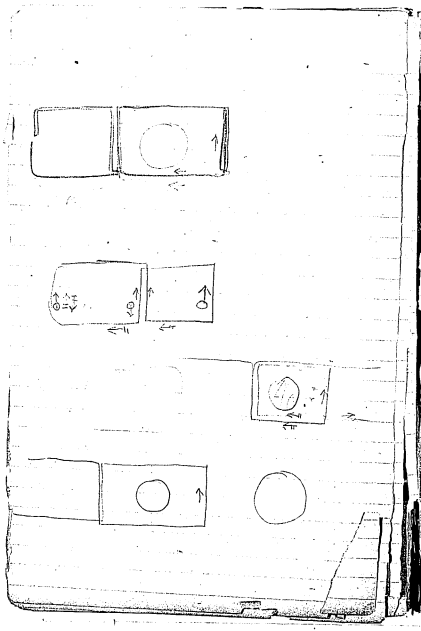
150 450-dwellings

100—

530
24
2120
1060
12720

1272
20
2544
1272
15.264

2/15.26
763.



156 lb Liquid

47.2

69 lb – 6 212
4.5
40
681.7

180,000
3000

445) 21000 (47.2
17800
3215
3115
100

69 lb per Hp Hour
430 for 7Li to 75 V
413 grms Each Grp

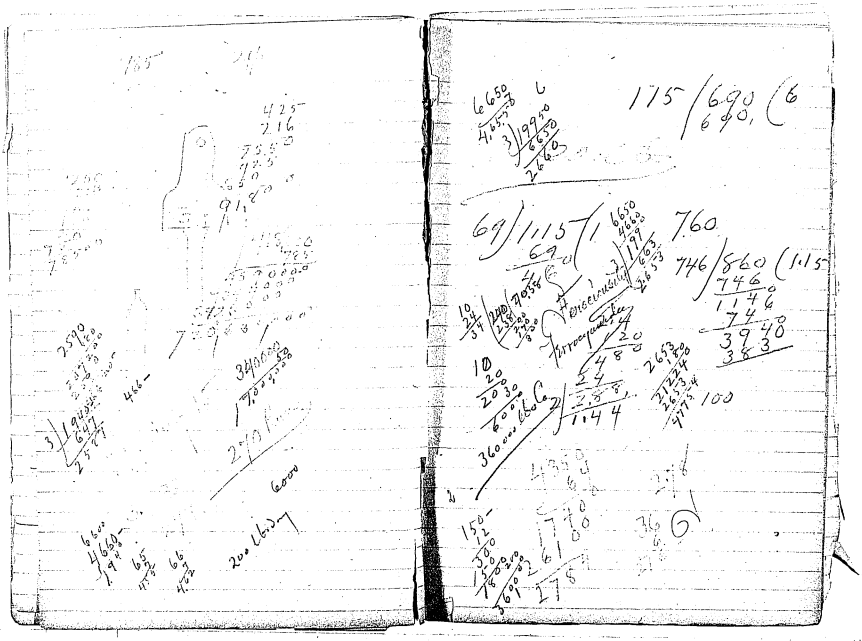
3) 1225
408

16) 1633 (102
16
33

1633

1733
128
3470
1335
2080
2075
1000
1000
1000

156



12 | 8800 | 733 ft long

24.00

733
150
3665
733
109.95

55
40
220
4
150

3 12

50 | 144 | 34
50
144
98
44
50
50
50

157.00
47

733
34
2
293
9
2 197
2 4972

2 | 733
366

350
400
75
100
4
15

35 | 30
10

10,000.00 - 100/1000 Cubes
Contract

10000 - Surfacing 60 000 —

50 50/1000 Cubes 15000 Surfacing

25/1000 " 3750 Surfacing

20 — 60-000

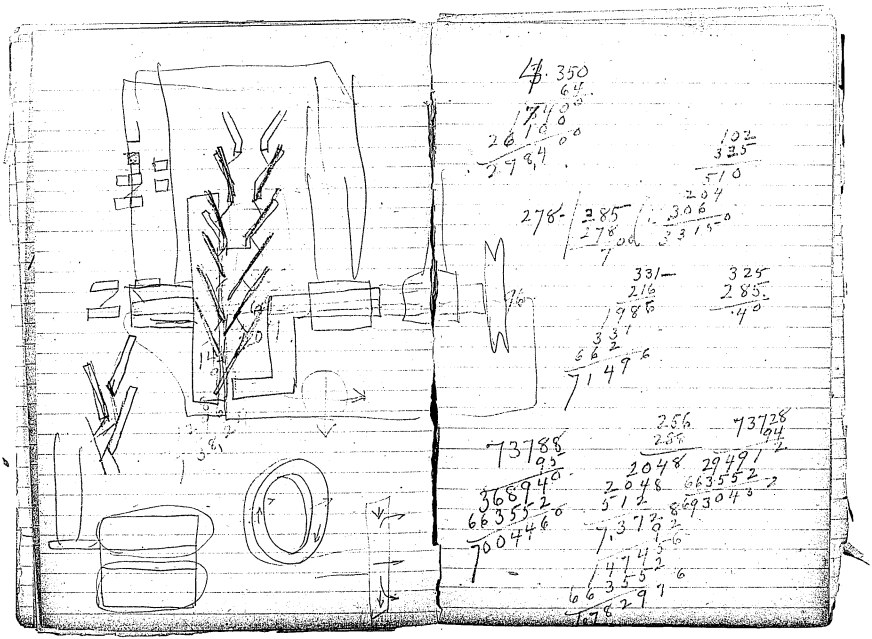
8- 150 80
20
250

80- 3

3 | 300

9 ft hard Cubes 50/1000 — Surfacing 15000
25/1000 30 000
12½/1000 60 000
6.25/1000 120 000

10/1000 —



5 9000

72000,

14400

7200

864000

256

32

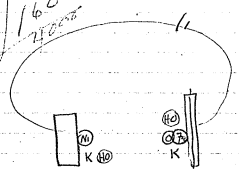
14400 water

960

240

850

720 630 000



K_2O HHO

K_1

$-O-H_2O$

200 000, share

140000

100 000

14,000

10,000

40 dollars – invested
5 yrs at 4 20 –
Leases 20. finally invested
at 1 share, pay 8 percent
or 4 on 20. 20% on the money

45 – back 20 leaving Cost
25 4. years 16% on money
50 20 back Cost 30.
4 reed 12% on money

1% on Com –

		1%	2
5	50c year	10%	20
6	50 "	8.4	16.8
7	50	7.2	14.4
8	50	6.25	12.58

550 – 5

450

650

Pref 5 yrs Cost 40. 20% on money
45 16%
50 12%

	1%	2%	3	4
Com 5	10% on money	200	30	40 0
6	8.4	16.8	25.2	33.6
7	7.2	14.4	21.6	28.8
8	6.25	12.5	18.75	25.0
9	5.5	11.0	16.5	22.0

New Cap – 12000000 Com
3000000 Pfd 240000
1.500000 bnds – 90000
3 300000 fixed

45 cbbl – Sold 70 Capacity 8000 day 325 days
Recpts 600000 –
330000
820000 – surplus –

2% on 12 million 220,

Have leaving 100000 surplus 2% on
stock – 16.8% on Com at 6.

5 | 30 000 000
146 000 000
16 000 000
7

5000
400
20 000 000
400
3 | 1100
300 000
146
176
146
263
7000

263
30
5
1315
1841
1975

349 000
170 000
6000
2000

6840
4.1848
4900
4.1848
11

49
49
245
245
245
245
4844
3
4842
4842
210

11

20 m

900 000 000
4000 000 000
8000 000 000
2 | 1200 000 000
1200 000
6000 000

65

718
60
450
4308
300
65
500
1800
718
65
1800
1795
559
4308
975
4867
975
1385
146
1461

30
3000
30000
146
10000
30000
50000

750 –

4 bushels – 30

$12

720 –

3|4220
407
57
32 | 1660

1810
120
690
360
180
90
45
2.25 3 | 1160
387
1547
108.5
49.5
14.5
59.5
38.5
4

3|1120
373
149.3

1627
0
694
33
181

3|100
33

3|1110
370
148

39
9
17

30 plates

90
300

600.

Nolan processes

Extracting for Cu ores by lead
~~ore~~ not now done – large slag ag →
cost process used – ~~[illegible]~~

Supposition furnace 11 tons lead
Ag ores added when letting common
form – 50 to 100 lbs ore that has
been used – the impure litharge
raked off – ore blende & copper
ore Ulmann ore – ore fcontes, pretty
rents As + S if present ore puts at
Eliminated Ag is reduced by the Pb
fraguently that PbO – any residue
on top with fluxed by the PbO
when slag flux, raked off & supposition
proceeds by adding wood as
Cinder place 2 day 1/2 hours
1/2 ton is added to bath having
11 tons lead

The Chief Ferro used to hand fume removed
ores preparatory for something [illegible]

Ag Sulphide — not completely
decomposed by Lead nodules

Copper dissolved by H_2SO_4 is nic — Cu granulated
H_2SO_4 passed over it, solution left upon
[illegible] (warm)
water filtered (warm)
Ofts Co Ni dis Pb undissolved
Sb Sn Bi form basic salts remain
principally in residue Ho
quality goes into Sol as As_2O_3
" chiefly remains as insol
! Arsenates — Antimonates
& Arsenates are decomp
by warm H_2SO_4 forming
Antimonic & Arsenic acids
CuS also Au Ag remain in
residue —
Tower used, lined with Pb —
false bot, air Enters bottom
wet top, steam used
heat liquid

Every hour or ½
Long trough used 360 ft long for 8 hrs.
at end trough Pb dissolved & antimonic
& [illegible] formed
most dry formed imp'd at 1st end trough
with Bi yields $CuSO_4$

Careful roasting will permit $CuSO_4$
& $FeSO_4$ to be formed & by careful
roasting leight the whole a / $FeSO_4$
decomposed which more dry
$CuSO_4$ decomposed The Fe_2
decomposed oxidized SO_3 & not SO_2

With a mixt of CuO & Fe_2O_3 —
3% Sol. of H_2SO_4 will dis the —
Cu but no more steam & [illegible]
to heat not density required
exceed 26 B otherwise gypsum
get choked with [illegible]
Residue has all the Ag Au Pb
[illegible] Co Ni As
Sb Bi & $CuSO_4$ any Ag that may
have gone into sol is reduced
by $FeSO_4$ to metal

1

Augustin process
AgCl in ammonia chloride chloride solution
roasting with salt & dehydration
75.504 — the AgCl is dissolved out by Sol Common Salt the
ag. ammonia precipitated by
NH4Cl + Co2O3
100 pts Sol. Salt dissolve 1 lb 20 ounces up
0.4 AgCl (or another more strong
1 litre Saturated Sol Nacl dissolves
0.195 gram AgCl at ord temp
or 1.27 gram at 196 Cent
Solubility of AgCl in Nacl is far less than
in CaCl2 by AgCl. Augustin process
not now used
If gold present can AgCl be dissolved
with Na or Ca Thiosulphate is best
to separate the au —
Vats used fabric lost
Arsenic & antimony ag are unsuitable
dis & give rise to alg. based
one condition necessary in Augustin
process Sb or arsenic Sb 9Pb
except in small quantities.

Pilera process
Ore roasted (chloridizing)
AgCl dissolved by ~~Na Thiosulphate~~ Na
Thiosulphate Ag precipitated
adding Na Sulphide — precipitated by Cu
not feasible as Na Thiosulphate sol
dissolves AgS as well as Cu2S
insol compounds of Na Sulphide are
precipitated which regenerates the
Na Thiosulphate —
Solvent power for AgCl of Thiosulphate
is 100 times greater than that of
100 pts Thio dissolve 40 pts AgCl —
Ca Thio dissolves about as much as Na Thio
91 to 100 —
Thio decomposes the AgCl forms
Dom Sulf. Na Ag Thiosulphate
Pelera process crushed roasted not as
fresh in Pb Cu or CaCl2
Ca gives Caustic in roasting & reduces
AgCl to Ag & dumps sol of most
insol Compounds in Thio —
Tendency of Ag to form
Sol Dom Salts & that precipitate
lead as hydrate & thus carries
particles of gel with insol chem

Practical application —

Impurities which become insoluble of Pb & Cu precipitated by selectively soluble sulfides by leaching water before running Thio

Pb may be precipitated as Carbonate

used in Thio by using Na_2CO_3

Cu particularly important if ores with Pb because they is difficult to separate from precipitate Carbonate Pb + Cu Sulfides. Then fully Cu + Ag Sulfides precipitate —

Sb + As do not act injuriously as it does in Amalgamation process because Arsenic & Antimonide of Ag give up free ions which combine to Thiosulfate Salts

Any insoluble silver present or formed during roast is also dis by Thio solution though unknown need Ag Sulfide or its compounds with As or Sb Sulfides do not all dissolve by Thiosulfate —

Rarely Thio solution used to dis AgCl already existing in ores but generally used on ores containing impurities or compound sulfides of Ag which have been chlorodized to avoid

This process not used for exclusively Ag from the leaching products

(Ag_2AsO_4) dissolves in warm Sulfite solution 0.2 part Ag for 1 part crystalized Na_2Thio — Ag Antimonite requires 1 part Thio for 0.05 of silver.

Solubility of Arsenates & Antimonates is considerably increased by presence of NaOH in solution!

$CuCO_3$ is sol. Pb Fs - Mn Zn Ag Carbonates insol in Thio. Cupram (OH_2) is sol but Cupric OH & Cu O are OH_2 + hydrates Fe Mn + Zn not sol —

Cupric Cl dis with formation of double salt. Pb SO_4 dis to double salt CT

Calcium SO_4 dis forms Na_2SO_4 + $NaCaThio$

Caustic lime — sol in NaOH + $NaCaThio$ produced the sol in Thio forms CaS_2O_3 — H_2O

117

936 000

24) 2808000 (117000

2 5 3. 1 gram

36 — 36 grams per liter

312) 12000

1000

312000) 12000000 (.38

2640000

120000) 312000

15 3) 100000 (14 74.60

20

148

Solubility of Ag&Cl in Thio demonstrated
by precipitation Pb + Na Sulfide
+ particularly by Cornish & Clark
Clark & Cornish patents —

Kiss process
Thio used, process same as
Patera — the Ag ppt. by precipitating by
Calcium Sulfide Calcium Thiosulfate
being regenerated —

Russell process
Ag present in ore as sulphide
or in combination with As or Sb sulfides
or as amalgamate or cyanide
or in metallic state with gold
is dissolved by Sodium Copper Thiosulfate
Ag precipitated by NaSulfide —
in Russell process used as complexing to
Patera — Solution 1st by Na Thio,
then follows with "Na Cu Thio"
the latter solvent dissolves gold, Ag, metallic
Sulf. or any sulfide amalgamate or
cyanide of Ag by replacing this

to prepare NaCuThio — $\frac{1}{4}$ pt by wt of
NaThio 1 pt. CuSO4 added to water —
Decomp by air. make as wanted.
Russell's sol'n this real active Ag
at and below 9 times + at 50°C 3½
times quicker than NaThio
Reason of increased solvent power due to
Cu Sol'n absorbs O from the air nothing as
a carrier of O.
McCallin & Gill in this about same as
with Reg Thio Na
Ag Sulfide rapidly decomp by Double
Salt CuS by precip + Ag ppt. sol
(by this in crude Cu)

Claudet process
precipitation of Ag from liquors by
Zn & Pb — if lead present Pb Zn & Cu
come down —

Gibbs process for precipitating Ag in solution –
Uses H_2S & stops after 6% of the Copper has been precipitated – so all the Ag will be precipitated by this time – being roasted, Cu partly converted to $CuSO_4$ + part oxide – while Ag converted chiefly to Chloride by action of Chlorine remaining behind in precipitate roasted ferrous ground & treated in Vats 1st with H_2O then hot NaCl, which dissolves Sal treated milk form – whereby all Ag is heavy insoluble precip
for precip Cu dissolve H_2SO_4 & decomp residue – Continue till all the Ag off –

Duclos proposed to leave ferrous & dissolved iron thus the Sal ammoniac & proportionately smaller amount Cu precipitate – Cont

Cut to here

Ziervogels process

Converts Ag by roasting into Sulphate, when Cu Fe sulphates present, very careful roast, $AgSO_4$ Sal H_2O + precipitating Metal Copper –

Careful roast of Cu Matte containing not too great amt FeS Ferric Sulphate 1st formed in addition to Fe & Cu Oxides – as temp raised, the Sulphates Fe decomposed SO_3 evolved this + O of air bring abt formation $CuSO_4$ The latter Sulf being elimd at temp that yields SO_4 decomposing temp $CuSO_4$ decomp to $CuO + SO_3$ – or $SO_2 + O$ – SO_3 act by converting the hitherto undecomposed Ag2S into Sulphate, SO_2 + O being produced the O yielding powerful oxidizing action on the $AgSO_4$ $AgSO_4$ is effected at temp where $CuSO_4$ decomposes – careful result – $AgSO_4$ & oxides Fe + Cu

If temp too high Ag Sol decomp

If As or Sb present arsenic or antimonide of Ag formed on treating these by ammonical H_2O according have Ag if Bi present it forms metal dissolved sulfate the which silver sulfate Bi.

Pb or Sb sulfate.

Process sulphuric dissolves separation & electrolysis precipitate separation

Hence of Cu process depends on separation of As Pb Bi Sb compounds

1 pt Ag Sol dis in 180 pt. H_2O.
" 88 boiling H_2O
180 H_2SO_4 110 B and boil
30 " boiling 10 B.
20 " 20 B boiling
4 " Cold H_2SO_4 60 B
0.25 boiling H_2SO_4 66 B

If Cu prime or present in result are precipitated on dis in H_2O must be resolved so Cu precip —

~~Ag~~ Raw ores never worked by this process reason in Spain Ag precipitated by granulated Cu & put in Terrible Vats.

Cyanide process

Ag or Ag Cl sol in KCy & precipitated by Zn Pb or HCl,
0.5% sol. 10 hours, then same strength sol 5 days then 1/2 strength for which —
HCl precip Au as $AuCy$
the weaker the sol the more Au dissolves

Amalgamation process

AgCl easily decomposed by Hg from
Mercurous Chloride Ag which is
with Hg — AgS slowly decomposed by
Hg forming HgS more rapidly in
presence of Fe or other base
As + Sb compounds of Ag are only
slowly & incompletely dec by
Hg alone,
Decomp of AgCl by Hg marks loss of
Hg from HgCl — best use metallic
Fe to decompose in presence of Hg then
amalg Hg —
AgS ores are best treated with incorporation
Fe + Hg or CuCl + Hg either alone
or together with Iron Cu Pb or Zn
or else Ag ore Chlorinated roasted &
then treated Fe or Cu + Hg
If ores contain As + Sb CuCl + Hg used
or CuCl together with Fe Cu Pb Zn
+ Hg — or Hg roasted Chloridizing
treated with Fe or Cu in presence
Hg — Clay or Magnesian silicates
in ores bad Coat mechanically

Gold more easy to amalgamate Zn Pb + Bi
also amalgamate —
As + Sb only amalg with difficulty
Fe Co Ni not at all —

Amalgam in presence of Fe or pyrites
but without previous chlorid
roast,
used where Ag exists in form
Sulphide arsenic or Sb compounds
or simple sulphide or form of
simple haloid salts —
Rich ores, being coarsed — amalgam
& separation —

Krohnke process amalgam

Hot Sol Cupreous Chl in Common Salt
to decomp Ag compounds which
are then reduced by Zn Pb used
in form of iron cement pan —
The S As + Sb compounds are reduced
electrolytically. Sn + Cu are best for
reduction Fe Pb + Sn more feeble
silver recovered by use powdered
Zn or electrolytically —

991	1088	97	1088	1109	21		
953	1037	84	1035	1072	37		
970	1050	120	1075	1086	11		
974	1084	109	1090	1097	3		
931	1037	106	1026	1046	20		
964	1065		1063	1082			
959	1041		1047	1058			
961	1053		1057	1070			

3)1080 — 360 — 144

1440 — 800 — 1750 — 144 — 2.97 88

805 — 37 — 68 — 35

27000 — 340 — 110000 — 8500 — 9.14 — 9

125 — 37 — 88 — 352

260 — 125 — 130 — 26 — 3.33 — 40

9000 — 9

8100 — 340 — 32400 — 2430 — 2.716 — 2.536 — 2.477 — 310 — 1.94

12 Million

390000 — 145 — 23 — 130 — 430 — 290 — 3.33

725 — 146 — 65.50 — 4.93 — 3.70

266 — 3.33 — 730 — 9.41

17% — 1900 — 1600 — 1,300

12 — 400 — 1200

12 — 2600000 — 390

12 — 1.97

65 — 140 — 600 — 74 — 21 — 8.16 — 8.16 — 4.46

2.106 — 120

8.40

3)1080 — 360 — 144

1440 — 800 — 1750 — 144 — 2.97 88

805 — 37 — 68 — 35

27000 — 340 — 110000 — 8500 — 9.14 — 9

125 — 37 — 88 — 352

260 — 125 — 130 — 26 — 3.33 — 40

9000 — 9

8100 — 340 — 32400 — 2430 — 2.716 — 2.536 — 2.477 — 310 — 1.94

12 Million

390000 — 145 — 23 — 130 — 430 — 290 — 3.33

725 — 146 — 65.50 — 4.93 — 3.70

266 — 3.33 — 730 — 9.41

17% — 1900 — 1600 — 1,300

12 — 400 — 1200

12 — 2600000 — 390

12 — 1.97

65 — 140 — 600 — 74 — 21 — 8.16 — 8.16 — 4.46

2.106 — 120

8.40

991 — 1088 97 — 1088 — 1109 21

953 — 1037 84 — 1035 — 1072 37

970 — 1050 120 — 1075 — 1086 11

974 — 1084 109 — 1090 — 1097 3

931 — 1037 106 — 1026 — 1046 20

964 — 1065 — 1063 — 1082

959 — 1041 — 1047 — 1058

961 — 1053 — 1057 — 1070

3)3292 — 097 — 5)4819 — 964 — 5)5326 — 1063 — 2)2112 — 1055 — 2)2141 — 1070 — 5)5314 — 1063

3)2910 — 970 — 3)3240 — 1080

3)2974 — 991 — 3)3110 — 1037

123 — 961 — 1.16 Cu 504 — 5410 — 1082

400 lb. water

94 — 931 — 26

3)3328 — 1109 — 3)3216 — 1072

3)2265 — 1088 — 3)2108 — 1053 — 500 — 4000 — 250

3)3079 — 1026

2000000 — 16000 — 4 — 3)3259 — 1086

3)2259 — 953 — 64 — 8000 — 1000 — 125

3)3225 — 1075

3)3102 — 1034

3)3112 — 1037

3)3137 — 1046

3)3225 — 1084 — 3)3271 — 1090

3)2923 — 974

[illegible] is considered for the precipitate.

Cuprous Chl should be prepared when used as it oxidizes quickly to Cupric Chl & oxychl.

Preparing by using 1 pt $CuSO_4$ dis in 6 to 20 pts of Conc NaCl or H_2SO_4 to [illegible] of 0.5 to 1% of the $CuSO_4$ used as for the Sol.

Abstracting in to add NaCl to 2 oz $CuSO_4$ of 50°B so long as the dis Cupric Chl & Na_2SO_4 formed. Liquid boiled by steam & heat. Copper used reduces the Cupric to Cuprous. The free SO_4 precipitates from brines. The Cuprous Chl though slightly oxd H_2O is insoluble, but in NaCl.

Sol ok as long as decolorized.

Zn amalgam 1 Zn 10 Hg heated together then excess Hg squeezed out.

Barrels used - rolled, pitch pine 3" thick now being served to break up the dry - lined to prevent removal of Hg.

Vessels must be used free from reduced Cu & Cl to Cu. Wood rods used to break up ore.

~~Solution~~

One Con Sol to 3 times ore. Strength sol 8% + salt used in 3% of wt of the ore.

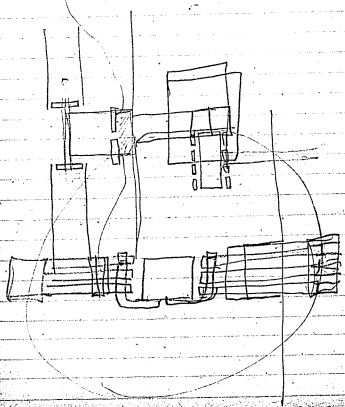
3 times ore requires 600 lbs Hg. Care taken that at end operation. Excess Cuprous Chl to prevent after mixing - Vessel filled could be [illegible] allowed stand some time & then readded to 1 to 2 hours. Then water scattered Hg.

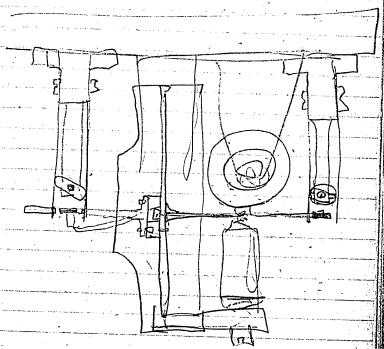
Amalgam Coal mine Cu & Chl.

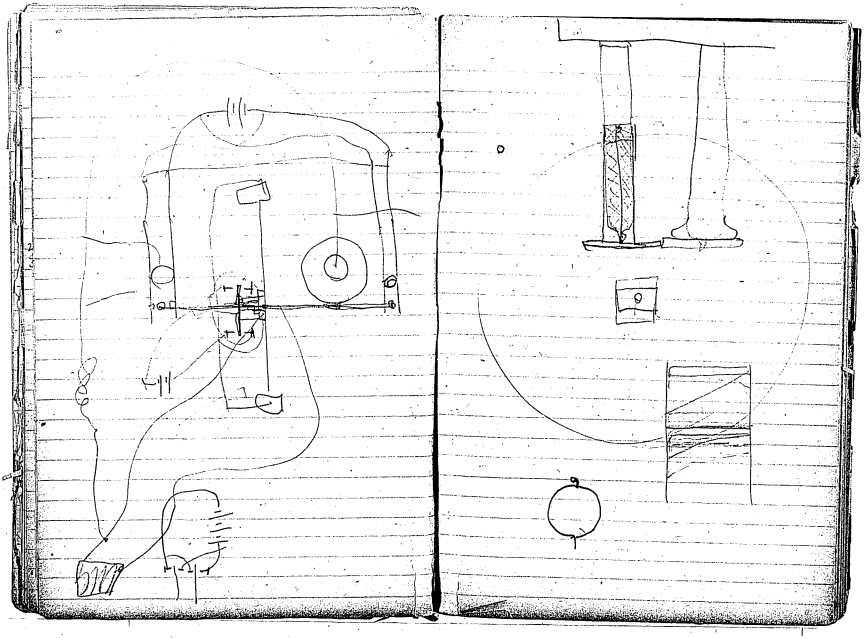
Amalgamation of Silver ore. High [illegible] NaCl & thermo, sulph roast. High [illegible] reduced. Ag converted into AgCl & As + Sb compounds. Silver also converted into AgCl. Then SO_4 evaporated the residue by [illegible] off SO_3 leaved HCl & Cl for the NaCl - The ferric chloride in dissolving the Ag

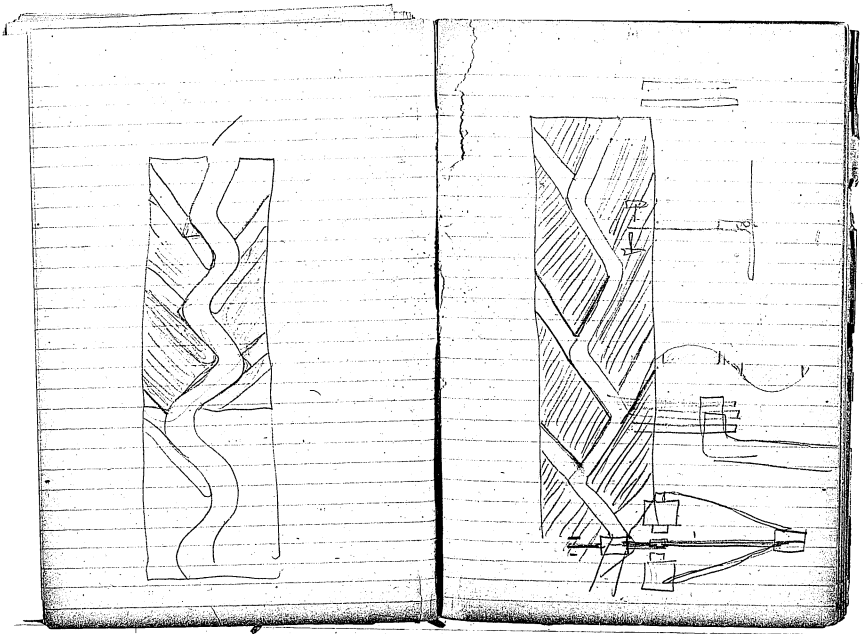
400 lbs rosin dissolved in 8% NaOH &
2% dehydrated Tapioca Bulk Gum

Reese River Pan process
Chldg round.
pans with wood sides
Millers.









64
320
70

3/4

16
64

160
80

1:2

40

16) 100 (6

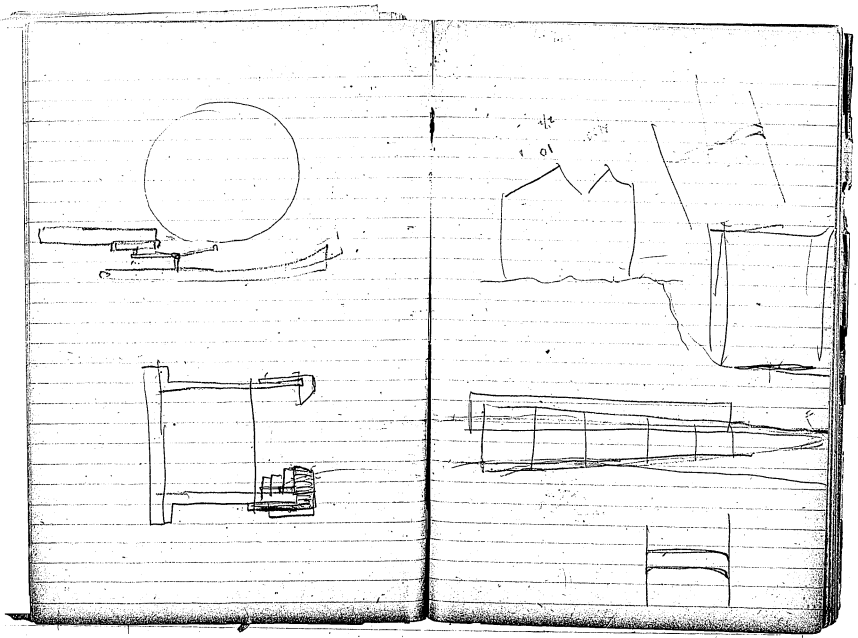
8 10
16 5
32 2 1/2
64
5 1 1/4
10 .6
20 3
40 1 1/2

2175

714 66%
357
4 378
476 1175

80 % 20 5% 40

4166 5 416 25 2175
1320 45
1316 3 75
1335
1200 84
95% 16 4200
1300

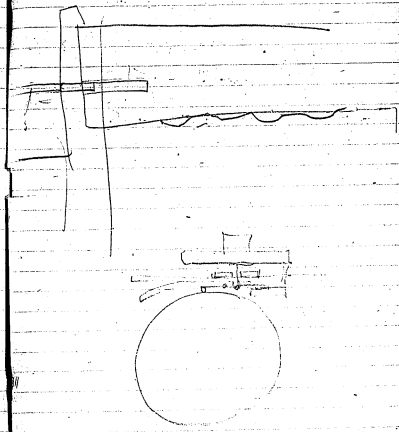


2000 —

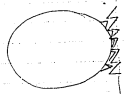
57

57 —
2
114 —
20
2284
4 | 9120 | 190
12 | 2280
20
108

190
450
950
760
950
855
2565



003— 1800 Each



108 gram per 1000

324	003	.72	lb
432	004	.96	
540	005	1.46	
648	006	1.46	

005 540

446 | 3240 | 72
31 22
116

446 | 4320 | 96
4014
3062
22

4320
108
35
1296
1296
-96
3

3 | 1350
450
3 | 225
75
3
0

180
180
0

180 | 144
180
324

180
9000
0000
-54
004

446 | 5400 | 121
446
9 48
7200
4

1320
420
80

446 | 6480 | 145
4460
2024
1784
2360
222

003— .72 lb
004 .96
005 1.21 1/2 lb more
006 1.45 .73 lb more

1.21
.72
.49

1.45
.72
.73

1.21
.74
1.95

210
144

2.80 | 446
1.44
920
920
2.3
3.3.1
3

3310 | 74
3.22
188

N
S
N
S
N
S

269	250	62500	275	4125	15	1.65	mult for 6	1413	4239 per plate
225	200	40000	225		18.2	1.35	" "	905	3258
221	175	30625	200		20.6	1.20	"	692	2768

1060 Gaui

442

275 250

2500
250
125
500
500
62500

2768
2249
275
15
4125

3258
2250
6

424
6
2647

175
175
875
1225
175
30625

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15
1375
275
4125

225) 4125 (18.2
225
1875
1800
750
675

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6
1950

200) 4125 (20.6
4000
1250

275
165
200

50

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905
7240
905
7629

905
18
7240
905
7629

442) 40000 (90.5
3975
2200

90.5) 7629 (1060
353
1413

1413
15
7065
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21195
4239

1629
7
3258

905

1413) 62500 (44.2
5652
5982
3652
3528

44.2

442) 30625 (69.2
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4178
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1200

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692
20
13842
27.68

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1413
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4239
1.20

977	1139	1173	1186
1020	1175	1187	1225
983	1149	1181	1212
899	1102	1126	1127
899	1045	1064	1113
952	1122	1150	1173

5)4758 / 952

5)5610 / 1122

5)5865 / 1173

3)3344 / 1113

5)5757 / 1150

3)3135 / 1045

3)3257 / 1086

3)2697 / 899

3)3381 / 1127

3)3306 / 1102

3)3377 / 1126

3)2637 / 879

3)2930 / 977

3)3160 / 1020

3)2948 / 983

3)3525 / 1175

3)3449 / 1149

3)3417 / 1139

3)3518 / 1759

3)3559 / 1186

3)3356 / 1187

3)3636 / 1212

3)3518 / 1173

3)3542 / 1181

3)3674 / 1225

959 — 1041 1047 1058

8)7671 / 959

8)8326 / 1041

8)8375 / 1047

8)8466 / 1058

1126	1269	1291	1159
1104	1234	1254	1155
1085	1242	1296	1124
1021	1223	1270	1228
~~958~~	~~1054~~	~~1053~~	~~1062~~
1084	1242	1278	1165

$4\overline{)4662}$ 1165

$4\overline{)5111}$ 1278

1070
1058
$2\overline{)2128}$
1064

$4\overline{)4336}$ 1084

$4\overline{)4968}$ 1242

Co	1084	1242	1278	1165
M	959	1041	1047	1058
	125	201	231	107

	1005	952	1122	1158	1173
024 Co	1084	1242	1278	1165	
M	961	1053	1055	1070	
	123	189	223	95	

$3\overline{)107}$
36
143
~~150~~
1440
142
254

$2\overline{)2128}$ 1064

$2\overline{)2170}$ 1085

$2\overline{)2168}$ 1084

$2\overline{)2242}$ 1121

$2\overline{)2242}$ 1121

$2\overline{)2584}$ 1242

$2\overline{)2592}$ 1296

$2\overline{)2248}$ 1124

$2\overline{)1918}$ 959

$2\overline{)2106}$ 1053

$2\overline{)2124}$ 1062

$2\overline{)2114}$ 1057

$2\overline{)2252}$ 1126

$2\overline{)2538}$ 1269

$2\overline{)2540}$ 1270

$2\overline{)2310}$ 1155

$2\overline{)2508}$ 1254

$2\overline{)2582}$ 1291

$2\overline{)2310}$ 1155

$2\overline{)2209}$ 1104

$2\overline{)2468}$ 1234

Co 1126 1269 1291 1159
1104 1234 1254 1155
1085 1242 1296 1124
1021 1223 1270 1228
~~958 1054 1053 1062~~
1084 1242 1278 1165

Co 1084 1242 1278 1165
M 959 1041 1047 1058
125 201 231 107

1005 952 1122 1158 1173
024 Co 1084 1242 1278 1165
M 961 1053 1055 1070
123 189 223 95

$3\overline{)107}$
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$2\overline{)2128}$ 1064

$2\overline{)2170}$ 1085

$2\overline{)2168}$ 1084

$2\overline{)2242}$ 1121

$2\overline{)2242}$ 1121

$2\overline{)2584}$ 1242

$2\overline{)2592}$ 1296

$2\overline{)2248}$ 1124

$2\overline{)1918}$ 959

$2\overline{)2106}$ 1053

$2\overline{)2124}$ 1062

$2\overline{)2114}$ 1057

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$2\overline{)2209}$ 1104

$2\overline{)2468}$ 1234

Co 1126 1269 1291 1159
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Co 1084 1242 1278 1165
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$3\overline{)107}$
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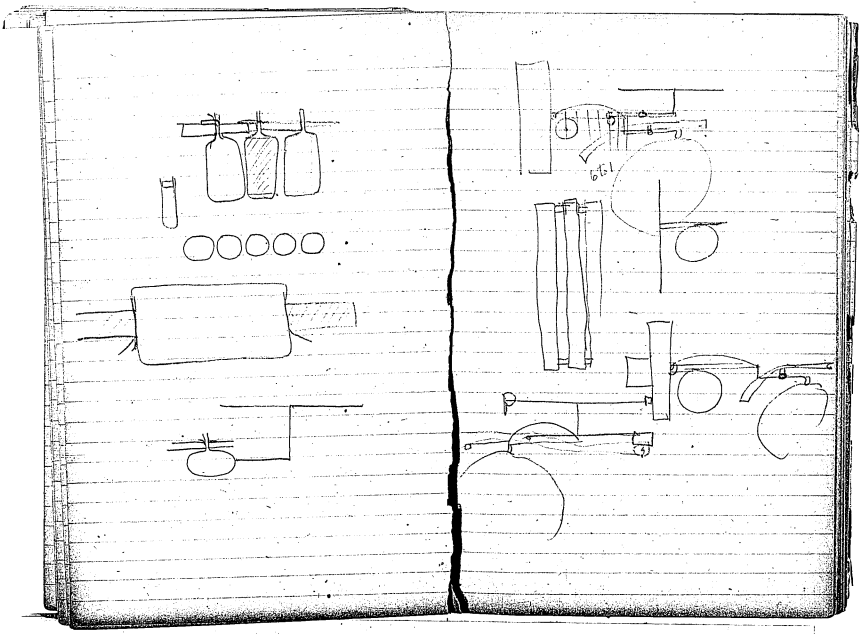
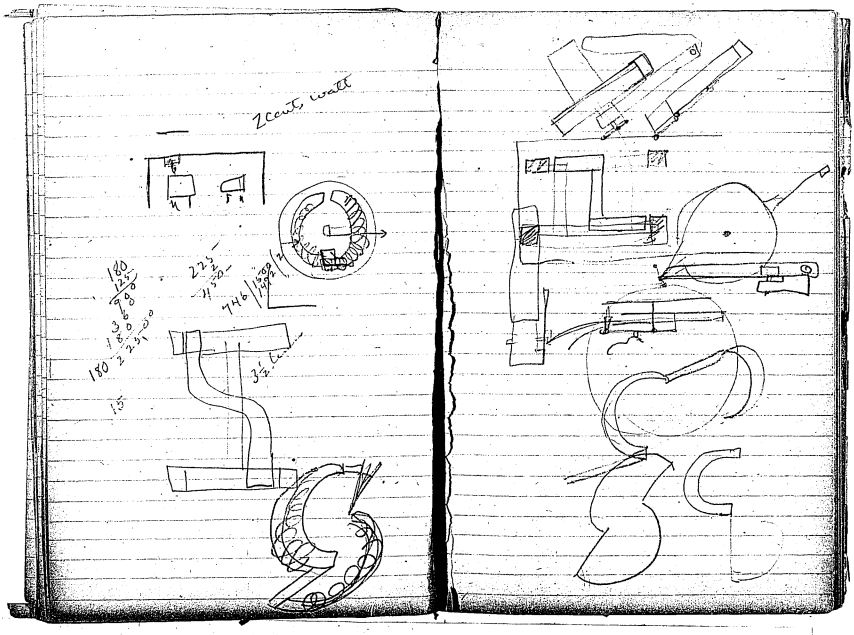



2 cent, watt
180
125
90
80
3
180
2
225
1.5
225
7.50
746
1.39
1.44
3½ ton

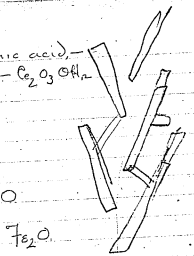
Succinic acid,—

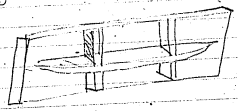
Fe_2O — $Fe_2O_3OH_2$

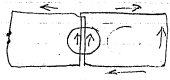
FeO

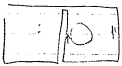
Fe_2O

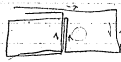
S

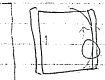


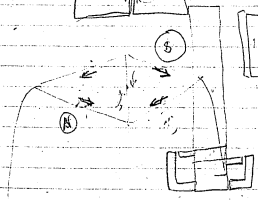


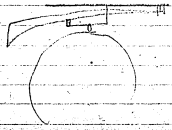








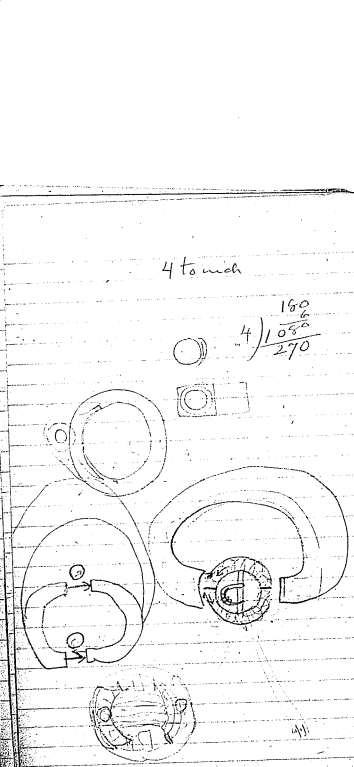




S
N

4 to much

160
6
4)1080
270



7c 77
5,89-

1.87 ft 1" thick

270
100
144)270.00
144.00
126.00
112.50
1080
198

100)1.87-
187.00
144.00
748
748
187
2692

3.5)2690(97 lb
2450
24

3600
325
7500
1000
$1,170,000
65000

1170000
216000
954000

954.000
330000
624000

120 | 6500000 (5:
600
5000
12 - 5/-

630
189000
120 | 70000 (583/3 - 14
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9000
4

$70 000 month now - 120 output.

$15 = " " " 9
12000 month bags -
270000 | 12000000 (4.4.
108000000
12000000

800.
$1000, day
90000 | 100000 (99
9000
1000

1,300,000 - 12
10/

60.
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18

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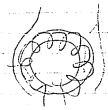
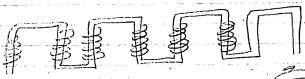
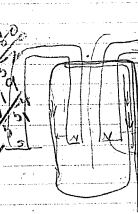
1,4





1064
353
741120



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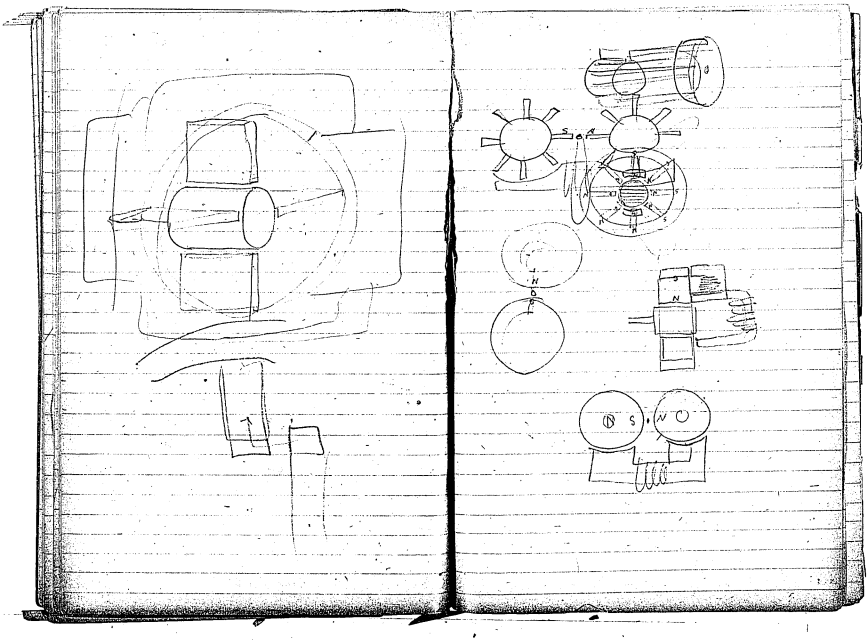
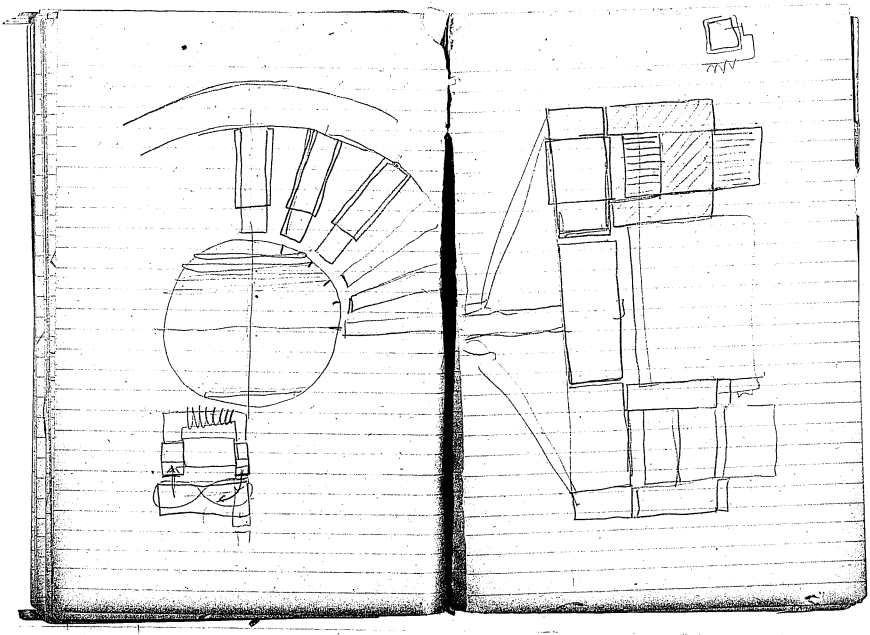
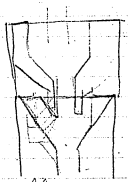
S
S


S
N
N
S



90000 inches

1728) 90000 (52
8640
360



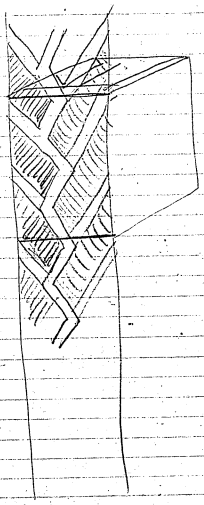
52 Cubic ft —

8 —

45
8
360
25
180
900

60
40
240

52) 2400 (46
208
322
312
10



#3 Cubic yard —

1200 ft 1"
875
2075

7 | 8400
1200

9 | 64

335
175
1935
3300
3310
3300
234

175

4 | 3500
875

4 Sand 1 Cement.

6857
26
548856
13714
19717

13
2000
240
2400
400
2800
275
25

3.5 | 6857

485
1944
3101

191
300
300
100
891

175

2134
460
2594

25 Cubic

275

100
38
3800
3800

1900 ft side —
315
2215

2500 ft

100 Cubic yd

35

210
6
4 | 126
315

8300
4200
5000
600
700

70

35

70
3

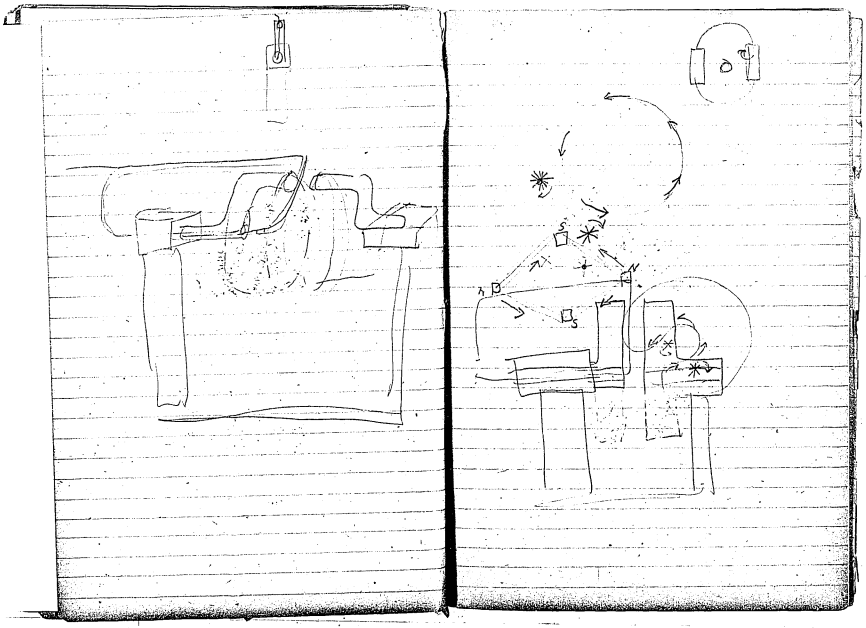
200
35
7000
6000
1000
4400
154

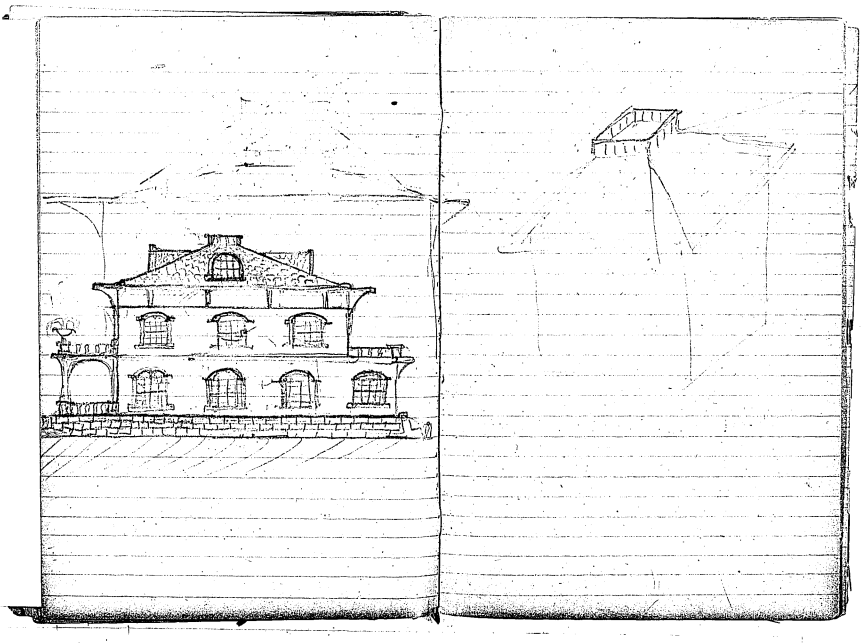
210
44

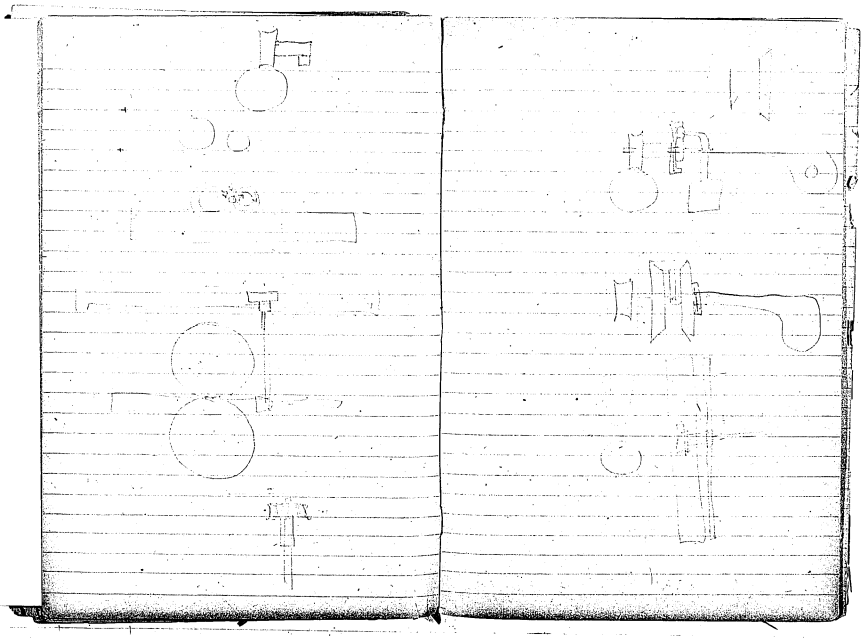
280
30
840

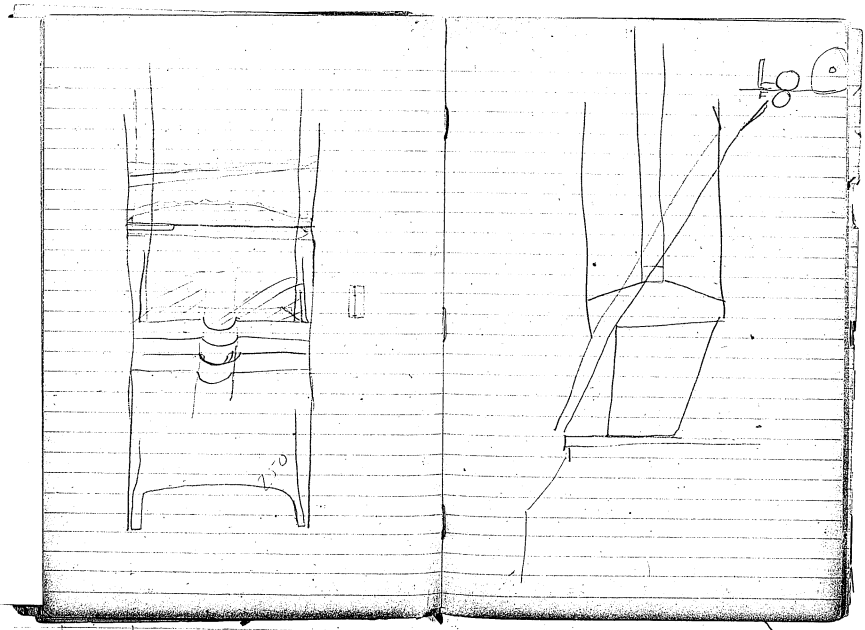
84400 3/8
3500 1/2

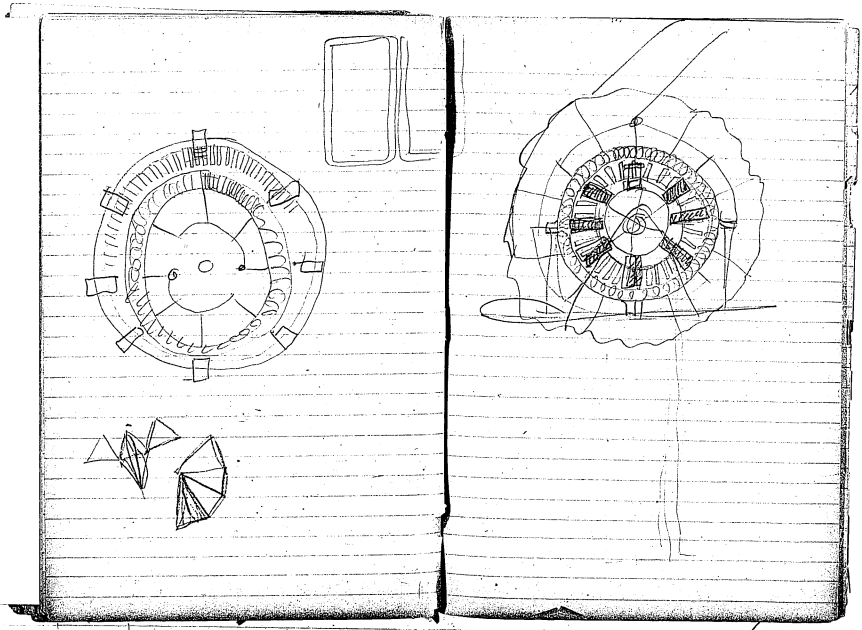
7000
3











5146 per ft

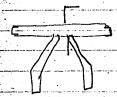
4779
140
16
191
4779
6691

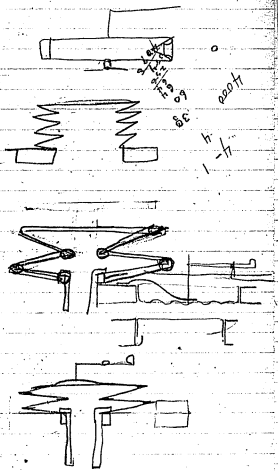
144 | 5150 | 35
432
83
3566 ft

669000

130 | 669990 | 5146
650
19
18
1300
1300
300

45
45
40
30

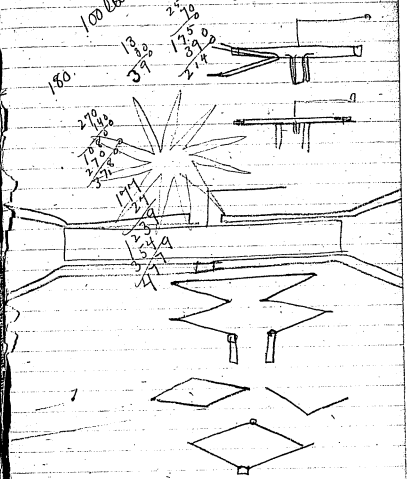


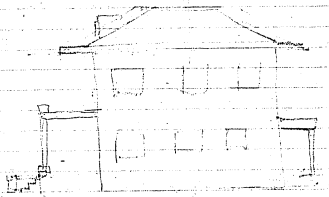


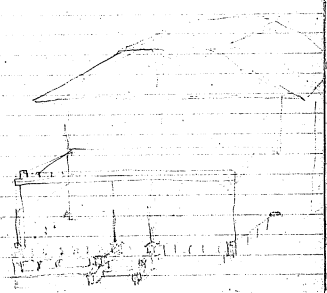
Hydrocyanic acid
Decomposed by NaOH,

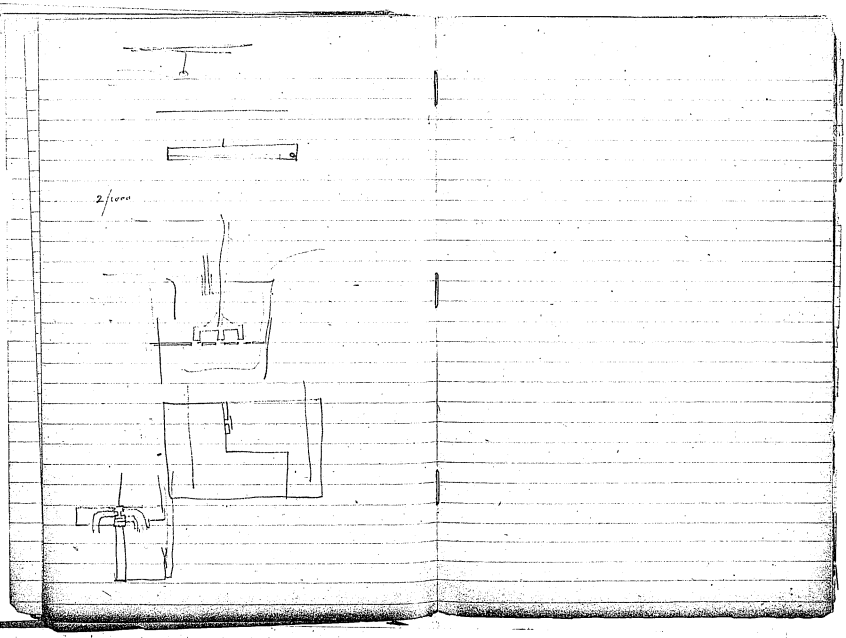
Lead by present Sulphurous acid
Nitrous O_4 – 7 filled SO_4
Nitric oxids
H_2S,
– Phosphorus
Arsenetted H, of Zinc test
the SO_4 has arsenic

Dumas uses U tube 3 ft long
broken glass 1st tube monsulfur
Nitrate Ag — then removes
H_2S — 2nd tube Sulphuric
Silver then removes
Arsenetted Hyd
then tube Lumps KOH,
then Ground phos
acid
The Sulphurous acid
should be free of
Nitrous and Oxides
Sulphate Cop absorbs Arsenetted Hy
" " phosphyd








2/1000

43
67
11

1254

170 | 740 (4.03
680
2600

850
30
2550

3

255

67

170 | 1254
1020
1940
1700
2400
2380
20

850

11

340
33
14
140
1254

850

850

510
230
740

9mm

7

55

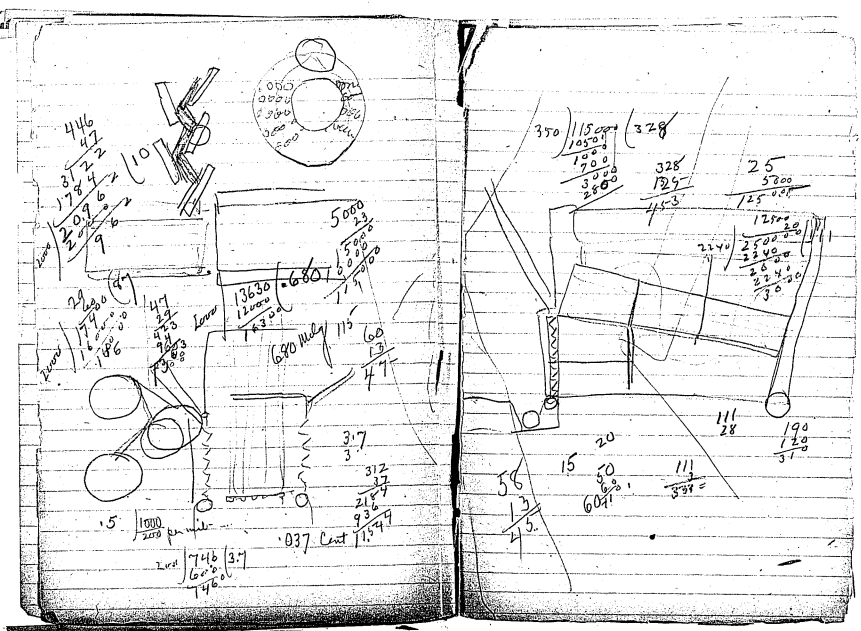
35
45
83
55 Cleaning

850
30
170

170
30
510

170
160
1020

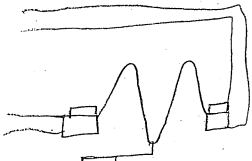
83
30
230
170
60


446
47
3122
1784
2096
9
10
5000
25
1000
2000
1000
1000
1

24
600
114
24
1420
1720
17.25
1.15
746
7460
1146
1146
1992
24
9.6
50
4.1
21
1.10
12
29
300
29
1
17.25
2.5 to 1 ratio
1350
1650
1350
1650
1350
1650

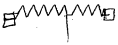
Iron 20
Ni 21
Cells 6
Water 19
Ratio 2

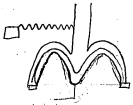
1.15) 680 (69
575
1030
920
1 3



20
20
40
40
160
27) 960 (36
81
1320

36
3
108





Notebook, N-02-02-09

This notebook was used during February 1902. All entries are by Edison. The book contains notes and drawings regarding several experiments that deal mainly with electricity, matter and energy, and physical theory. There are entries pertaining to x-rays, motographs, telephones, phonographs, and electric furnaces, together with notes on "instruments to detect different waves in the 'ether.'" Many entries contain the notation, "gave to John Ott." Inserted into the book are several pages of notes by Edison, including a 3-page note listing various theories of the ether. The pages are unnumbered. Approximately 120 pages have been used.

N-02-02-09

7.6

314
7.5
0
157
229 8
2 3.1 37 0

314
7.6
1884
198
2198
2384

314
7.75
0
157
198
219
2198
243.350

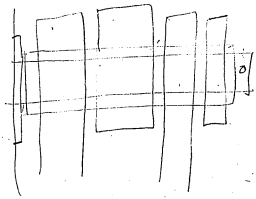
675
314
2700
675
2025
2119 50

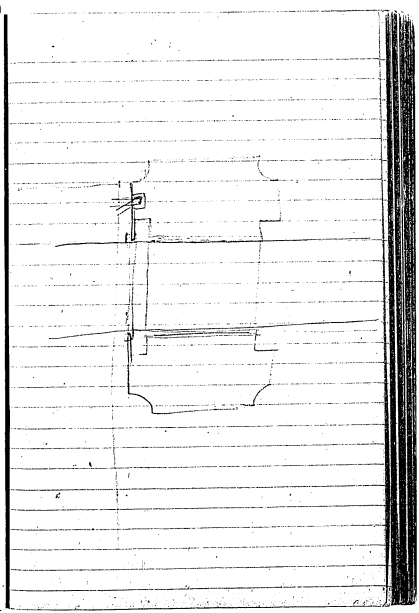
314
7.65
0
157
1884

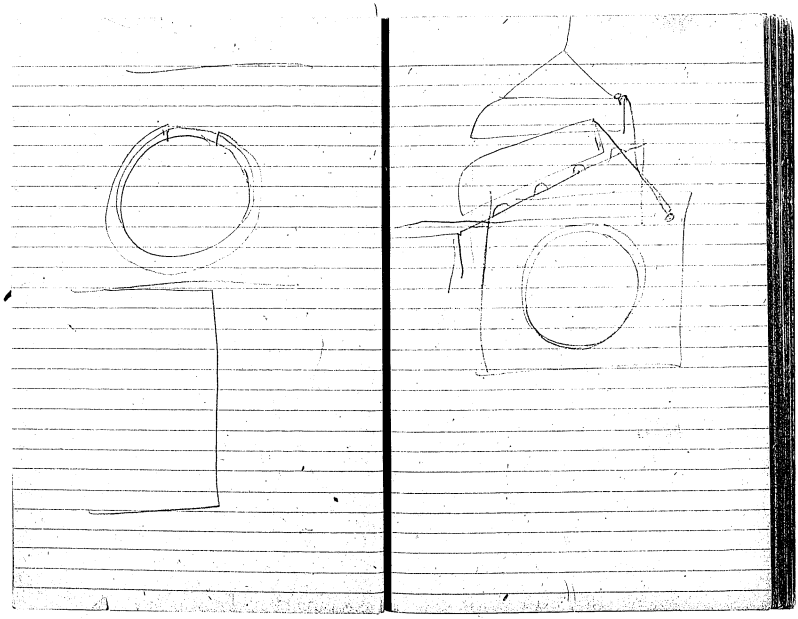
314
7.72198
0
2198 24021
2198
1417

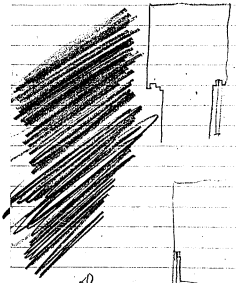
7.65

150,000,000,000,000,000









60 25
25 Hour
25 30

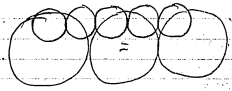
50 15

15.

12000
2220
240
240
240
240

36
6000
1600
2660
824
360
1440
1440

1600 | 2.88



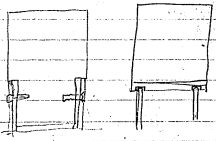
1500
750
750
300
300
300

135 | 2.2

25
675
750

15
50
75

25



220
1750
1300
450
234
216
300
300
14) 3300 (718

26
1400
1040
360
360
360
72) 1950 (650

200
8000
2018

22
10

16
166
160
160
160

Notes X

Calcium Niobate.

2 CaO Nb2O5 – fuming pent ox with large green crystals, | CaCl

Probably possesses Fergusonite or Columbite with CaCl + also some NaCl –

Watt 3rd S 1394 –
p 1392 – Indicates Niobium giving Vapor pent ohl Nb through red hot tube when heated with H – sheets steel gray color

Might try Samarskite powder with | CaCl + NaCl have Niobium Tantalum Tungsten Yttria Cerium Uranium Manganese Fe Magnesia – Some of the Crystals would be formed

putting phos in Vac + then
heating it sublimes +
in several days crystalizes
in a dog kind of Crystals
as Iridiopsis or diamond
but get opaque if exposed to
Light — of Chloroscope

Try fulminate Hg from
gun Cap for of Chloroscope

phosphorus Tungstic acid
forms salts,
should make phosphorus tungstate
of Calcium 3rd with
Sep 1656

Gadolinite has Lt
rare minerals in it
fuse

fuse the Samarskite + gadolinite
+ monazite sand seperately
in Carbonate Soda

Then make Silicate Soda +
dissolve the oxides — Then
mix & Hydrochloric & do &

Cerite - has Didymium

In addition try combining
Tungsten with the rare
Earths in they are
insoluble to have

Working Earths fuse finely powdered
mineral with $KHSO_4$ digest with
water, filtrate

14 tons

13 " two [illegible]

70

97 20

.5) 90 / 14

135 % slag 138 tons slag

27 " 3 Hgt

9 97 "

125 tons Thirty Seven

53 tons Coarse

8

150-

3) 125 / 42 / 83

75) 11500 (153

75

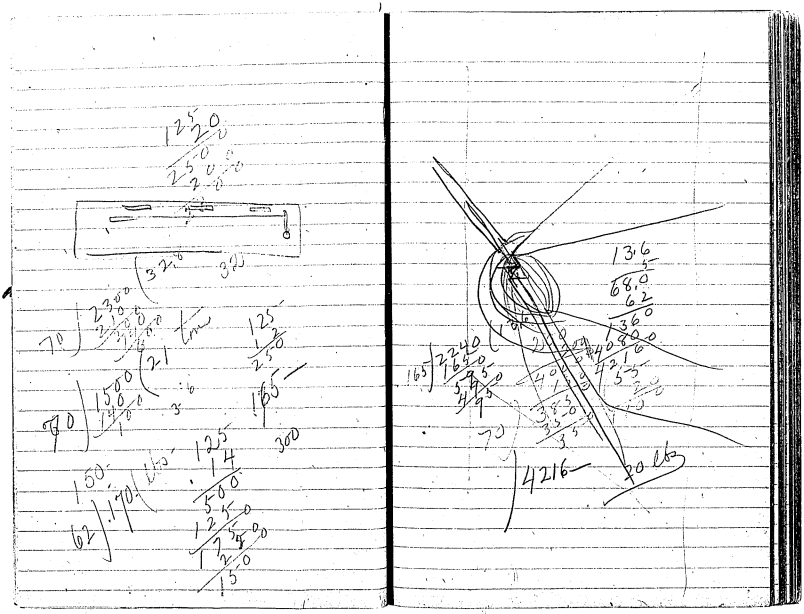
450

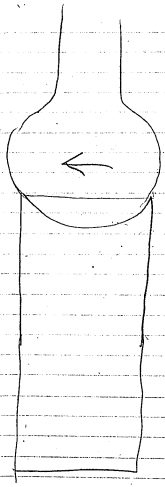
450

375

375

45



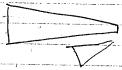


200- 47 ft

8.4 inches -

250) 1440 - (5.7 -
1250
1900
1750

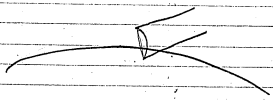
5 ft 8"

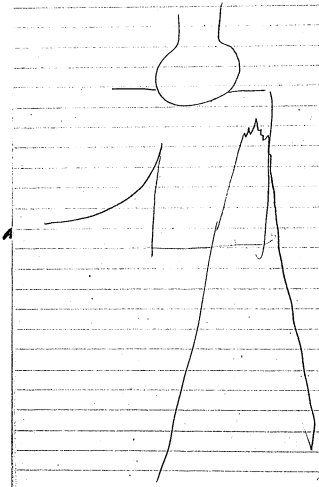


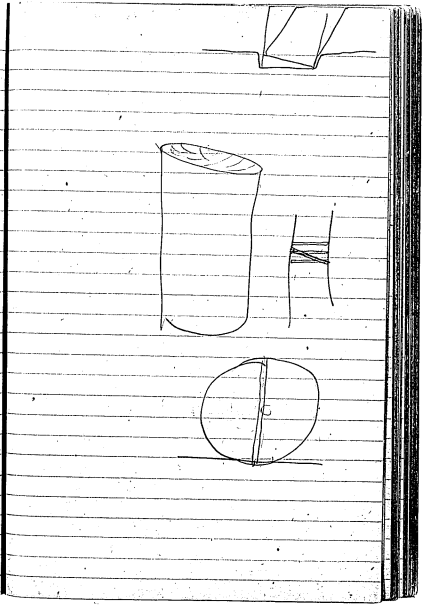
2000 (14400 (7

30) 1440 (47
120
240

1.2
7
8.4







Action of light & exposure to air & also heat on chemicals –

Quercitrin ammoniacal sol colors gradually exp to air

Quinidine HCl sulphate with excess acid highly fluor

Seeming stiff action of H_2SO_4 on Elemi & think it was I have a bottle

Quinine, shining electric when rubbed

Solution Salt Quinine bromide by sunshine — Violently acted on by electric is curious.

Acid Chromate of Quinine rapidly colors in light at 60 @ 65 cent critical point.

Hypophosphite of Quinine crystals which after heating to 100.

C gas, iff walls are highly Electric

Sulphate Quinine becomes Luminous at 110° C
The phosphorescence is likewise produced by friction
& becomes charged with Negative Elec.

Iodoquinine. Thus is fine see watts,

Quinotannic acid Electric by friction

Racemate of Hg luminous black on Exp. to light

Heat diffracted images of sun = effects extends to points where rays could not reach by direct. X Ray gave funnel fringe — try slit narrow tube

glass diffraction grating

Try Lamp blacking bulb of its low reflecting waves

As glue sugar amber trans X ~~Ray~~ but absb. Radiant heat! Try Rock salt which permits R heat to pass perfect
also use Rock salt employ if strip use it thick
Rsalt permits radiant heat from every source to pass without loss ~~and~~ no matter how thick

Alum stops most,

Hydrocyan-rosanilin See Rodhamber p.115 Vol V. perm in dark turns rose red in light

Rosemary Oil gradually absorbs O in shadow

Rosolic acid, forms salts which very easily decomp in sunshine unless with K Na NH_3 –

Ruthenic oxide liquid, dec by H_2O rapidly dec in Light

Santonin sens to Light

Ammonio Ferric Citrate dec Light prolonged developing with neutral Sal Silver salt

Use plain Chl Silver & dev by Hypo.

See Phosphine 3rd Sup Watts Splendid fel Light

1/150 000 000 —

490

0

1/64 of a grain —

40 gal.

1/30 000 of 3 —

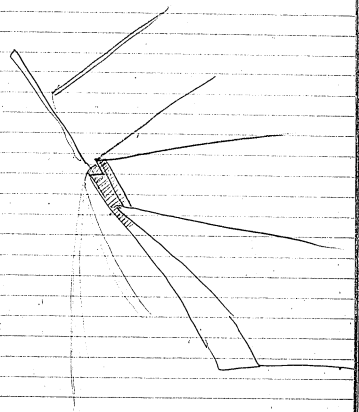
460) 30 000 (64 —
27 600
2 400

95 million —

5120
40
153,600,000

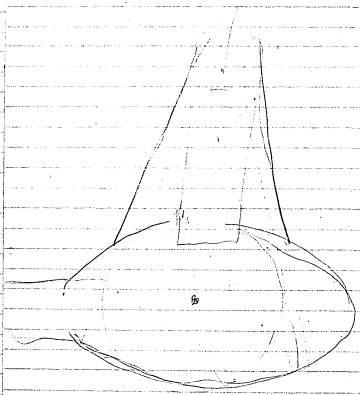
40
8
320 —
16
192 0
3 2 0
5 7 6 0
2 0 0

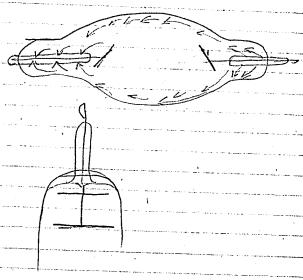
1



23 3 1

37.5





Instruments to detect different waves in the "Ether" —

Motograph —

Make mould for Regular Telephone model — Use Ear pieces, also make a Reg eye phone Reproducer eye with ear tubes & mould for chucks say 1/2" diameter, Hand driven —

make cylinders of great variety of oxides fluorides phosphates Carbonates Oxalates & Fossil materials generally —

Dark box with pencil points, Hunk Can find the old one —

Listening Telephone with fixed coil, removable Core, In place of the permanent magnet —

Cores of Iron — Nickel, Lead Tin Zinc Cobalt, Copper Silver, Magnesium Cadmium Mercury in glass tube, Aluminum Carbon Antimony — Tellurium Sulphur arsenic

Bismuth Selenium Tungsten in powder
also metted if possible, Iodine in glass
Phosphide of Iron, Copper, Lead Tin Zinc, Nickel
~~Z~~ Sulphide of Iron Copper Lead tin Zinc
Nickel Cadmium Zinc, Antimony Bismuth
Silver, Antimony, Mercury

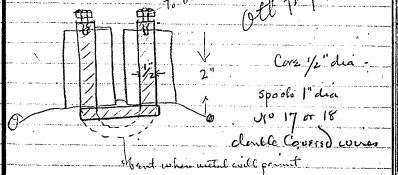
Bobbins of the following wire about some
size as used on Requeton Bell Telephone,
Copper, Iron Nickel, Silver Aluminum, Brass
~~German~~ German Silver, These bobbins
should also be removable —

Make the following diaphragms
Glass Mica, Iron Cobalt, Nickel,
Zinc Cadmium Magnesium Aluminum
Antimony, Bismuth, Silver Copper tin.
Lead, ~~Iron~~. Use a mica diaphragm
put a Cup 1/2 inch in diameter with
a Cap on Cup 1/16 deep so can put
crushed material in the Cup
or disks of material that cannot be got
thin enough for making a diaphragm

There should be no binding posts on
the Telephone as I want to Connect the Coil

directly with wires of the same metal

to bind down wires etc. 1917
Oct 7th

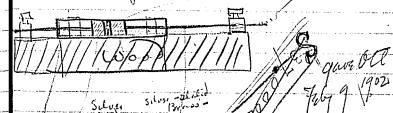


Cores to be made of following metals

Iron Nickel Cobalt Silver Copper Mercury in glass tubes Bismuth Antimony, Arsenic Lead Zinc Tin Cadmium Aluminum Magnesium Carbon Sulphur in glass Sulphides of Copper Iron Lead Nickel ~~the~~ other Sulphides that can be Cast. The spools are to be Easily removable or rather the Cores are to be removable

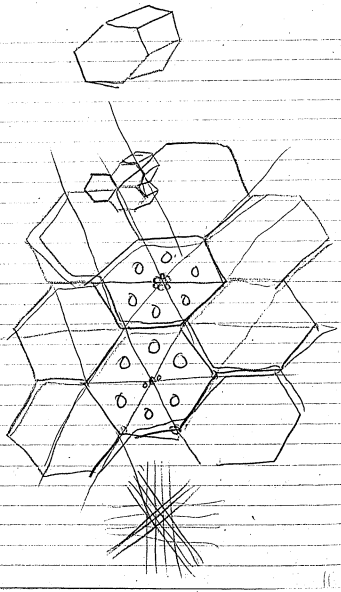
the spools being fixed to a brass
+ provided with binding
posts for terminals,

50 Branley Coherers -
Made no follows

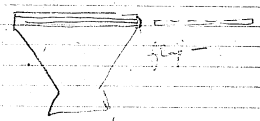


Glass Tube to strengthen + out +
carry current,

Glass held down by
Cellulose strips -
Effluent powders go into space between
Glass plugs
use different powders of all
metals + Conductors of
E = with Telephone Etc
+ Knock to decohere



2 Fluoroscope boxes, small size that we made first.

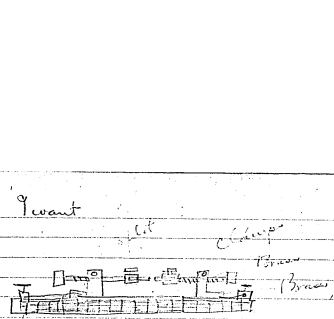


This has a thick rear No end to it as I want to slide in an opaque sheet of Rubber or celluloid paper, Aluminum etc + then slide in the frame with the crystals of chemicals pasted on the screen silk cloth, I want a model Fluoroscope made + 1/2 doz Slides before I go down to the Experiment to get right material to put crystals on

I think 5 X 5 slide with 50 spots one each will be about right

also want to insert a photograph plate

I want



Screws about 1 1/2" long
2 bending posts to connect
upright # 9 want to put
pieces of round iron into the tops
on ends of screws & bring them
together =

One —

Cell - porous Cup
Zn in NaOH, Copper in Cup with
Ferric Chloride, 2.14 Volts, precip is
formed in pores porous cell prevents
diffusion

Cell Porous Cup
Zn in Na Hydrate - Copper in porous
Cell & Sulphate Copper, precip also
formed in pores 1.5 Volts,
KOH gives much greater resolution

Zn in Zinc Sulphate
porous Cup Lead in Lead Nitrate
.6 to .7 Volt,

Zn in ZnCl
porous cell with Ag in Ag Nitrate
1.5 Volt very low res

All above form
precips in pores of Cup
and they Processable

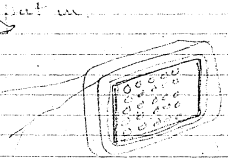
A Black hydrated Uranium
Oxide $UO_3 \cdot O_4$ thrown down
by Electrolysis of Acetate,
Formate or Nitrate Uranyl
Make some + test in grid

Investigate the fraction
on paper when over various
metals

Sodio ferric Oxalate is beautifully
Crystalline & very sensitive to light
use this and look up a list of
other salts to make dry plates
for photo from X rays from Crystals

Make 30 cc 50 crystalization of gold forming Cobalt
When same is in solu and
Very strong Current passing
also in very strong Magnetic
field —

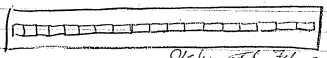
Make a Coil of heavy
wire so the slides can be
put in



Also try strong reverse Current
through solu — also dissolve
Hg Sulphide for —

Also try slides in strong
magnetic field —

John Ott Continued



John Ott Feby 9 1902

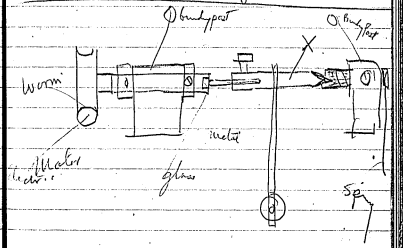
This is a metal sheet of brass
with flat pieces of metal soldered
or fastened on. Each piece is
1 inch square & 1/8 thick
The top are flush & smooth, polished

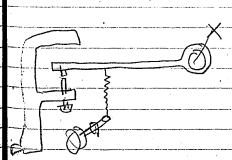
Use Iron Nickel Cobalt, Silver Copper
Lead tin Zinc Cadmium, Magnesium
Aluminum Bismuth Antimony
Brass German silver, gold plated on
Copper, platinum thin sheet soldered
to Copper, Lead, Tellurium,
&c

Experiments Phalogy
The conduction of Metals

Try some metal compounds chemists of
[illegible] collectively [illegible]
little [illegible]

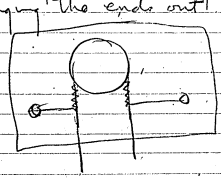
Collect ~~all~~ make all the
Compounds (dry) that phosphoresce
or fluoresce to light +
make ~~slides~~ of them —



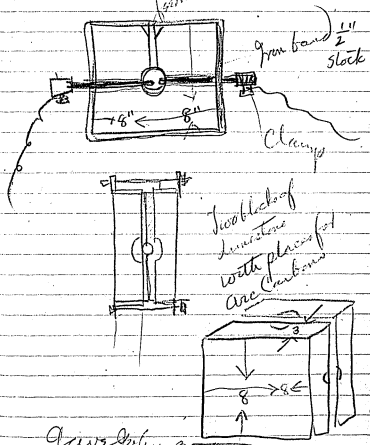


Jarvis to John Ott 9 Feby 9 1902

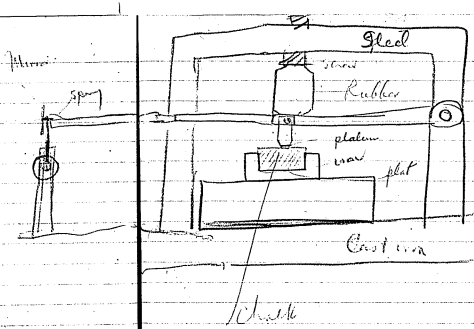
Make a number 12 smooth drawn iron wire Tape it with Rubber Tape, then wind one layer of No 17 or 18 double Cotton covered copper wire the whole length The wire is to be 200 feet long — ~~after~~ the wire is ~~being~~ wound Tape over the Copper wire, Then make a bobbin 10 inch in diameter 2 inches wide and wind a spool of the wire just as you wound a magnet bringing the ends out



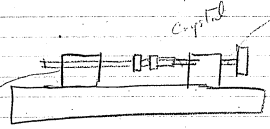
Want an electric furnace



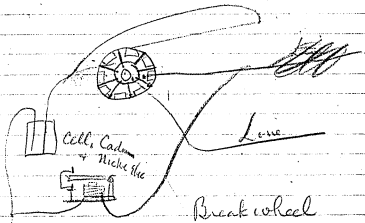
Gaw Gitu Ott
Feby 9 1902


Glass
Rubber
platinum
wire
plate
Cast iron
Sheet

Light or fluorescent Coherer.



Storage battery Relay or receiving Instrument



When wave comes over it
charges Battery then battery
throws over in a Sender
Its a discharge —
accumulative principle should be
very sensitive —

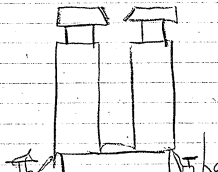
Invented a light for [illegible]

Photograph in Sensitive Emulsion [illegible]

Some arcs between the same metals to get a monochromatic arc & [illegible] to see if fluorescence also by X ray

[illegible] fluoroscope [illegible] Some photo plates are [illegible] sensitive [illegible]

Make photo dry plates with different chemicals sensitive to light



Large Magnet about same as on a No 4 or 6 Edison Dynamo with Movable pole pieces Mounted on a Wood Base

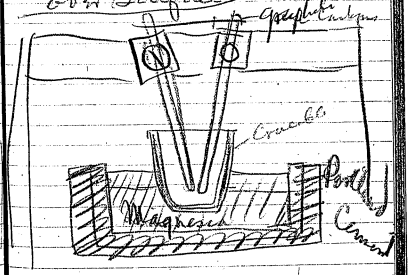
Given to John Ott

Feby 9 1902

[illegible] chemical
[illegible] Chlorate
Chlorate [illegible]
[illegible]
[illegible] Oxides —

Continue the [illegible]
Experiments with alloys
of the [illegible] Melting [illegible]
Can make them in Graphite
Electric furnace —
also in liquid gas furnace

A Malograph with a platinoid
Press cylinder to take
pleochf Chalk, so surfaces
Can be varnished with various
Materials to make Coatings of
Substance Can be electroded
over surfaces

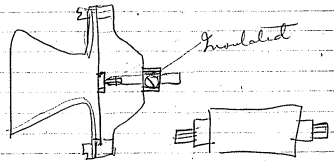


Electric furnace
Geo. Gibbott Feby 9 1902

Concert

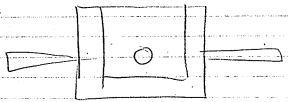
Phonograph, with a Cylinder ~~tube~~ of Brass to take the place of the record with a smooth Horizontal surface — This shell is to be dipped in different Emulsions to form a Coating — The travelling arm is to have a piece of rubber with a ~~[illegible]~~ arm resting on the Cylinder with a point of Tellurium. The Rubber is to insulate it. 2 binding posts are to be put on plugs one connecting the Base & the other the insulated arm with the Tellurium —

Regular Edison telephone transmitter –



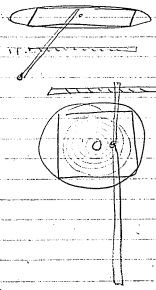
This telephone is to use a very sensitive Thermo Electric alloy – Coil with one layer of No 12 wire & secondary of 36 wire 10 or 15 layers

A furnace about 1/2 the



size of the one in the Chemical Room where Hatchett's Works, 4 blow pipes and very thick fire brick. It is to be portable & to get a very powerful heat,

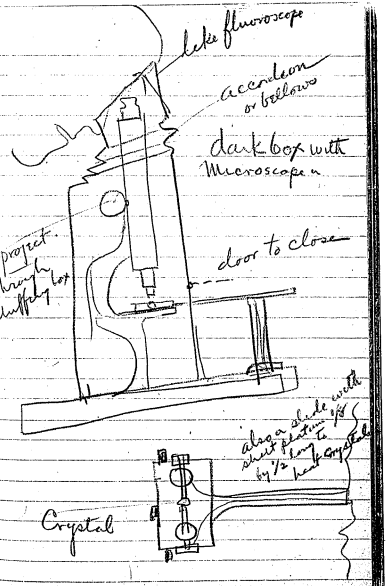
Get a gramaphone with clockwork



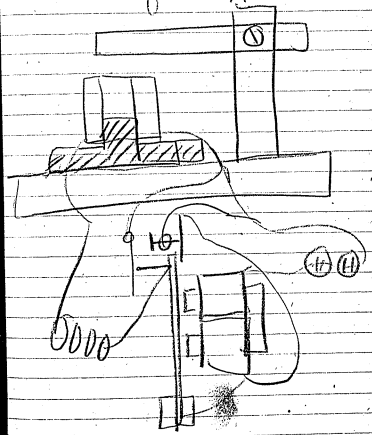
There is to be laid in the gramaphone disk a dry plate photographic a screw works the arm. The arm carries 2 platinum points close together mounted from each other. The current passes from one point to the other through the film in the dry plate.

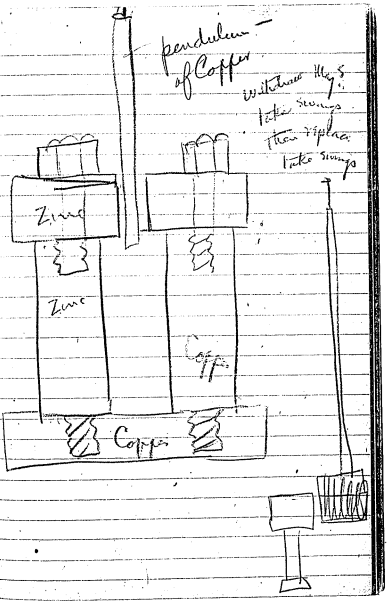
Dabbs to make a
[illegible]
[illegible]
3 [illegible]
to [illegible]
[illegible] 10 [illegible]
[illegible]
[illegible]
[illegible] 2 [illegible]
[illegible]
through [illegible]
[illegible] at X [illegible]

Insects to be used to
detect diffraction



Etheric force apparatus




pendulum of Copper
Zinc
Zinc
Copper
Copper

good) - find a crystal that becomes luminous by the current for a fluorescent Lamp. —

Remembering the phosphorescence of Edison's on hot stove, try all crystals on hot plate in dark room. Coy plate heated by Current, say thin sheet platinum, probably most of crystals will be anhydrous + those made by bringing temps up to red heat or more + also Crystals from furnace like the old Calcium — This would make it possible to get a fluorescent Lamp by heat, using a Vacuum + Carbon,

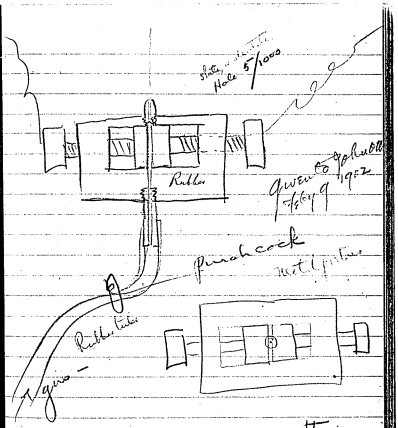
Dont fail to make many Crystals on the theory that a heavy or high atomic weight atom is to be combined with the very light ones in the Crystal so that when waves in the Ether pass thro the Crystal the inertia of the heavy atom will cause it to take up very little of the motion while the light atom will partake of or be set in motion to a greater extent & thus there will be an interatomic load swing within the Crystal producing a new wave say light,

Traces of oxide of platinum or platinic hexachloride salts Uranium Lead, Thorium, Etc,

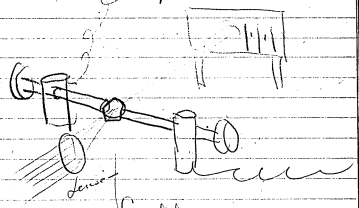
---

With X ray 48 Hale slides, make a lot with mixed sands from placers also with Crushed Rocks with view of detecting natural fluorescence

Chemical action of a non
conducting acid on Zinc,
should be able to increase energy
in proportion to value or coefficient
action. This process may be
the basis of X-ray
Electrolytic Chemical
Research machines
Using Tissue paper separating
Zinc & Cu & Zinc & Cu
or Zinc Cu or immersed
in say Zinc & Cu
Organic acids or Chloride of
Iron in Ether, or other
Organic acids in Ether or
Iodine in Alcohol Solution
use dissolved glass or
well rubber wool Tube
Electrolytic solution,



Gave to Prof. Ott July 9 1902



this beam of light passing thru Crystal, any variation E or elsewise will vary the pressure on Crystal & deflect the beam of light Spot to flicker on Scale – ought to be very sensitive –

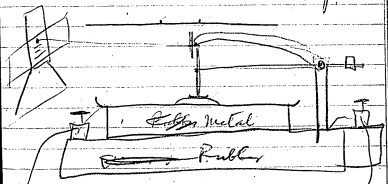
Uprights ought to be very rigid

Get some Radium, Actinium & polonium

To work by change of surface tension in non electrolytes

mercury

Liquid

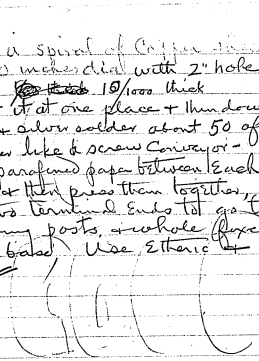


OK gave to John

Feby 9th 1902

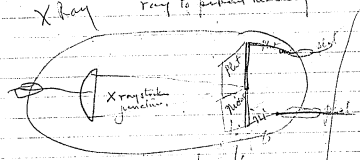
Crystalline some X-ray good
Fluorescin in water Cathode
Ca Wolfe Uranium or salt
Fluorescent material -

Make a spiral of Copper strips
~~12~~ 20 inches diel with 2" hole
Copper ~~[illegible]~~ 10/1000 thick
Split it at one place + thin down
top + allow solder about 50 of them
together like a screw conveyor -
put paraffined paper between each
turn + then press them together,
the two terminal ends to go to
binding posts, + whole fixed
to a board. Use Ethanic +
Etc =

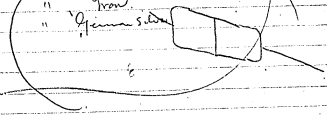


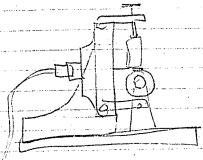
Momentary flashes of X ray to photo-electric

X-ray



Abs. plot + Al
" + Ag
" + Lead
" Zinc
" Magnesium
" Iron
" Gamma solution





Small Motograph (12) Reg Malogh
with small chuck 3/8 dia
1/8 shaft, 1/2" long Chalks
Cut from crystals which were
accidental etc where big
Reg chalk Cant be used —
just displace big chalk
Shaft worm etc & put
in the new looking small
chalk —

Note if wires are alternin
mag Put in Cell with Alum
electrode in it,

It may be that Radium
Polonium Etc is nothing
More than Regular Chemicals
with slight impurities of
Reg Chemicals, Same as I
proved that MCF with Edison
small tube in Agcl crystals
in dark with it Caused it
to phosphorence - long time
after X ray on it.

Hence Use Tungsten,
Uranium platinum gold
+ plat metals, thorium,
Lead, Thallium, to be
added in traces in general
proportions in crystals in
dark with alkali metal
+ others. Make 30 or 4 slides

Try Experiment with Radium to
guard it with various
substances. Will shut out
waves in the Ether Coming
all the time from a place
which will cause Chemical
fluorescence

When all the fluorescent slide are
exposed to are have hood which
can close down quickly on are
+ make room dead dark -
at each exposure food nitr are
Metal wires of all metals, see if
say Lead Monochromatic Light
will cause some particular
Crystal in time with Vibration
of Lead to respond a fluorescence
Also try powdered dry Chemical
Salts of metals to be blown into
are,

Materials for Photographic Cylinder

Phosphate Lime	Uranate Soda
Borate "	Thorium oxide
Oxalate "	Zirconium "
Sulphate "	Oxalate Uranium
Cyanide "	Phosphate "
Tungstate "	Borate "
Molybdate "	Tungstate "
Chromate "	Molybdate "
Manganate,	

~~Deposit~~

Crystals very small good
Crystalizing Chemicals
unfocused of strong arc
light & closed is and
4 hours with Daine
Golden in dark see
in Crystals the same

Crystals are about
between electrodes with
very heavy current passing
also at same near
arc light,

Substances for Malographs Cylinders

Sulphate lead,
Carbonate Copper
" Zinc
" Nickel
" Magnesium
" ~~Aluminum~~
" Tin
" Bismuth,
" Silicon
" Barium
" Cadmium
Sulphate Barium
" Silicon
Magnesia Oxide,
Prussian Blue
Nickel Hydrate
Ferric "
Tin "
Aluminum "
Magnesium "
Antimony "
Bismuth "
Copper "
Lead "
Barium "
Strontium "
Lime "

Make a revolving shutter put arc light in a cupboard + have motor to revolve shutter 2 or 3000 times a minute, + test slides etc,

Make a white with all the photomicrographs —

Make

Substances for Metough Cylinders

Cyanide Copper
Tin,
Zinc
Antimony
Bismuth
Iron
Magnesium
Aluminum
Cobalt
Nickel,
Cadmium

Phosphate Cadmium
Borate "
Sulphate "
Chromate "
Molybdate "
Stannate "

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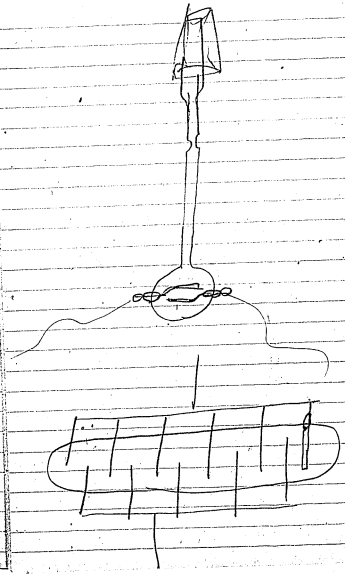
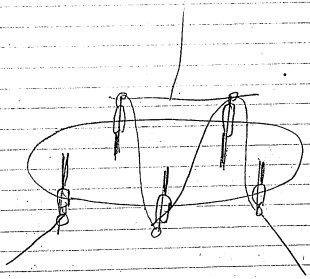
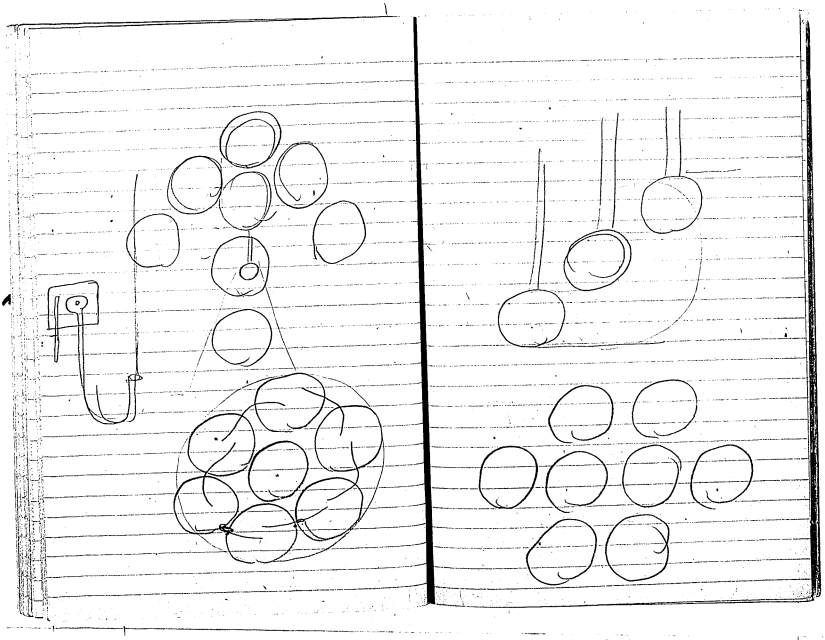
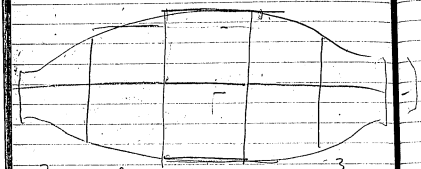






24 inches

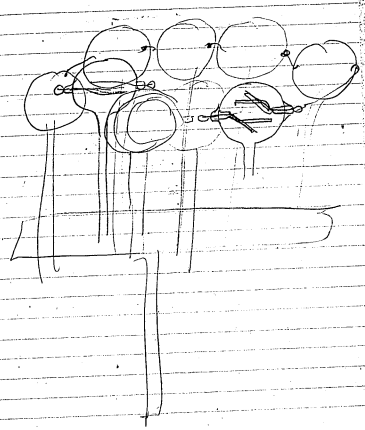


3 6 6 6 3

16 –

75
75
375
525
562

Equals 10



240 000 000

5000
12 60
30 000 00
36 00 00

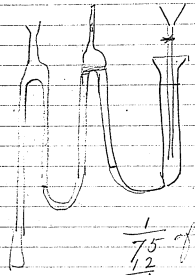
360 000 | 240 000 000 | 60
216 000 000
24 000 000

120 | 8000 | 133
60
7000
1800

320 | 8000 | 320
7000

320 | 2000 | 6.5
1820
1800

8000
5000
12 40000000
480 000
2 240,000,000



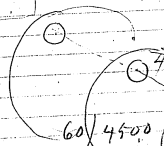
1/75 of sec
12
150
75
900

1/900
4
3600 ft-lb

15

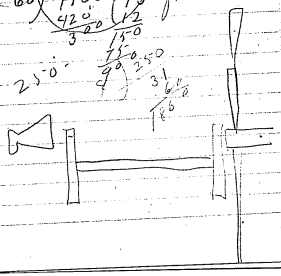
4 ft.

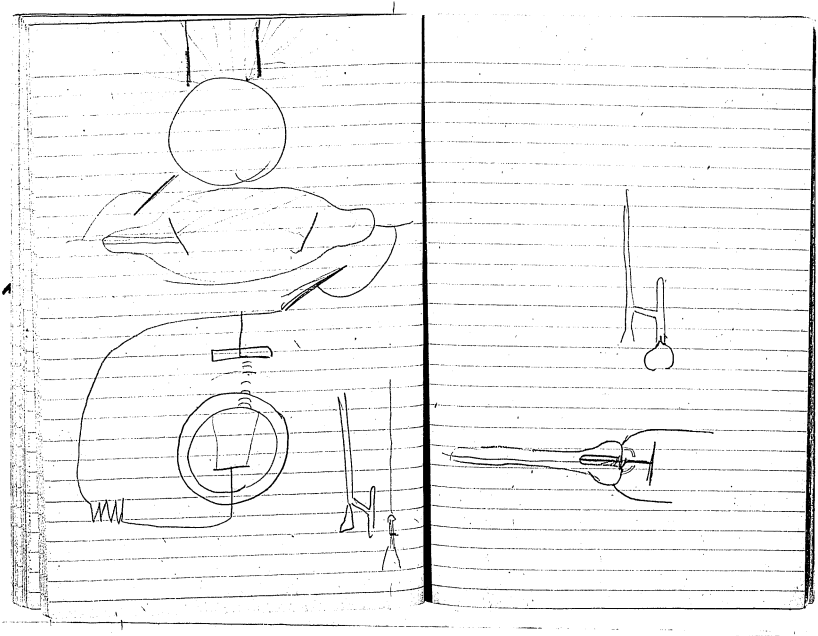
1500
3
4500

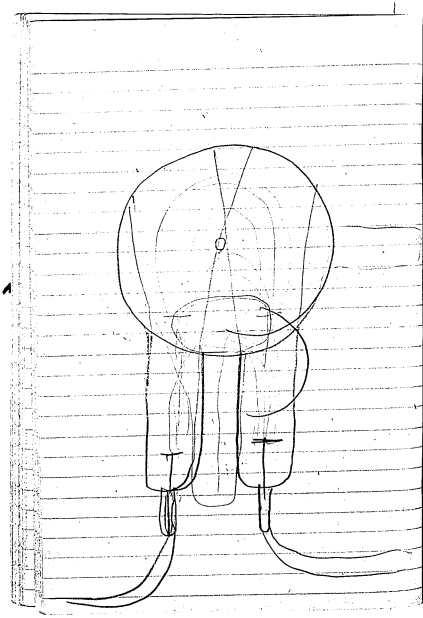


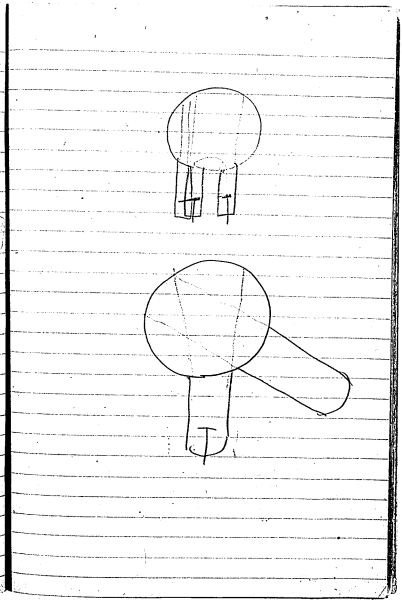
60) 4500 (75 ft sec
420
300
150
150
900
900
300
300
300

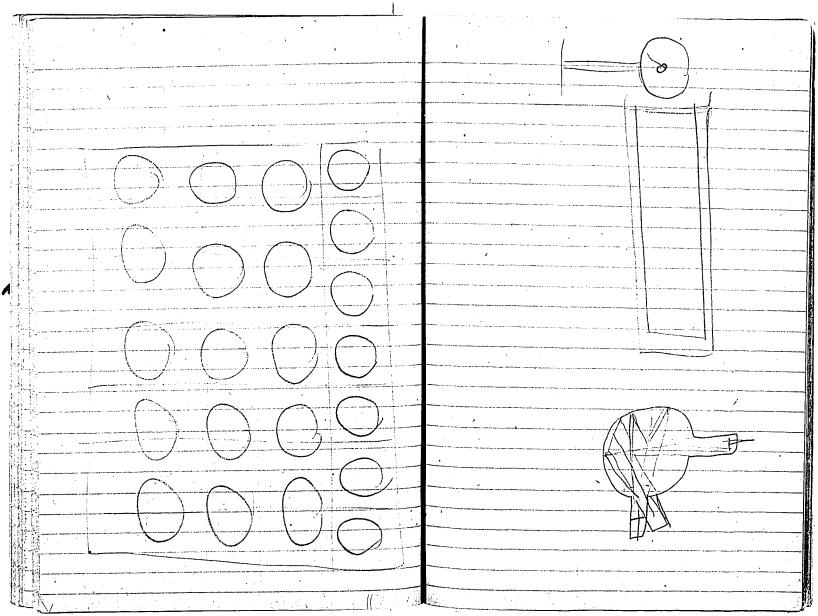
25

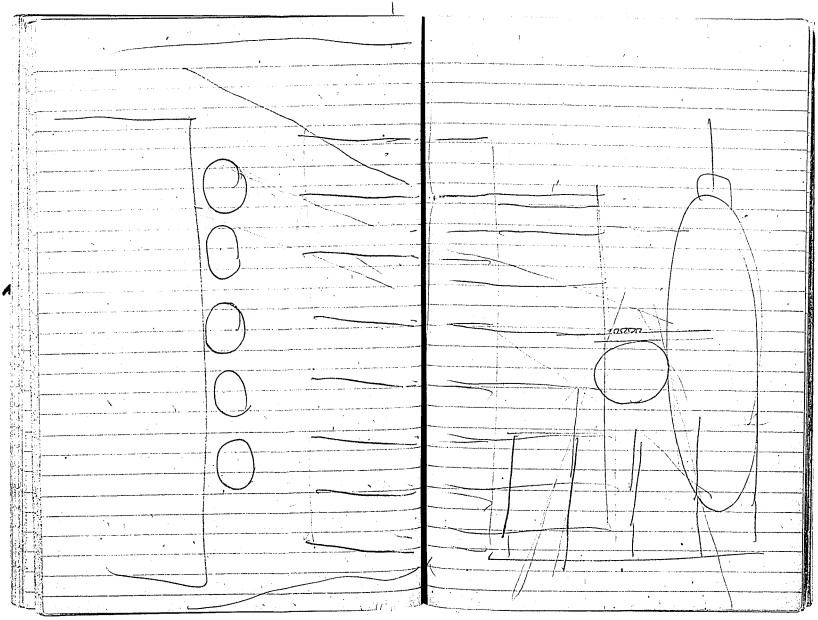












Phil's Car -
40.00
23.00
80.00
30.00
212.00
25.00
70.00
80.00
255.00
65.00
15.00
45.00
15.00
943.00

Apio - 1351. 130.80 1381.80

Hand - 17 105.00 122.00

State - 1.58 169 9.65 9.30 16.12

Furn. & Fix - 32.16 1.20 12.70 4.98 33.69 16.75 1.60 2.95 46.40 7.33 67.15 18.40

Clothes - 10 30 89.50 30.00 22.00 15.00 15.00 166.00

Tel. - 15.85 16.80 18.70 16.75 64.55

Entert. - 1.87 41.65 32.20 4.50 14.25 4.95 15.00 28.06 90.48 42.35 262.74

Exp. 9.85 246 .50 240 9.55 7.65 2.40 3.75 6.40 .25 7.31 31.96 14.45 55.21

Chas. 31.83 129.14

Gas - 3.00

Chris - 6.80 103.08 109.88

Reg. - 2.16 1.24 3.52 5.62 .80 1.23 8.31 .50 2.00 14.78 2.72 2.05 5.21

Dry - 19.12 3.30 17.70 8.45 5.60 41.00 25.95 123.85 102.40 67.20 15.16 501.61

Lanni - 4.09 1.60 18.90 8.25 50.18 12.00 949.12

Lum. 199.46 286.95 326.00 326.79 40.61 73.90 108.00 3.35.06 24.98 90.51 6.00 123.98 11.00 3046.68

Gift - 1.35 668.74 924.65 108.00 26.21 1767.15

Lib. - 5.46 13.57 53.25 7.50 1.50 33.88 1.80 2.93 665.1

Water - 139.70 8.50 148.20

Ill. - .88 32.00 1.95 2.25 .81 37.39

Edison - 304.00 9.11 2.90 239.36 7.00 12.00 39.03 120.91 375.65 6.00 45.46 10.00 175.22

Sales 184.00 189.00 184.00 184.00 224.00 202.00 139.00 84.00 255.50 64.00 167.00 68.00 254.00 199.00 149.00 2580.00

Gen. 150.00 110.00 1507.18

Nun 1200. 600. 200.50 200.00 200.50 201.18 100.00 100.00 100.00 100.00 50.00 169.05 150.00 203.25 401.00 185.00 118.00 181.15 150.88 140.00 122.62 110.85 2161.80

Fur 218.13 34.44 31.05 178.20 26.35 51.75 20.25 15.70 27.15 84.75 28.36 (666.37)

Sight - 89.86 88.40 68.86 94.45 78.77 73.72 2.91.00 93.72 392.00 89.50 78.66 103.11 82.65 1541.40

19.10 2.00 205.50 119.04 15.35 173.65 11.00 11.75 21.00 67.25 8.70 19.84 112.16 9.09 (736.93)

Mach. 13.88 17.25 69.72 15.00 4.10 76.50 21.38 2.10 3.00 18.65 (244.95)

Chas. 43.56 11.03 24.19 102.26 8.34 11.47 48.36 64.66 19.58 140.00 2.26 5.60 11.82 349.78

Chas. 84.27 15.00 162.96 13.75 40.55 3.33 167.21 162.00 262.04 761.15 930.27

Charles
31.40
16.44
86.55
48.42
10.35
50.50
20.25
2.50
3.00
17.05
286.46

Take X Ray photo with
Dry plate formed over with
Ed. Chemical Compound of
Copper Iodide, Ed Crystal
Iodine, Iodine Chloride
Iodine, Iodine Tri Some of
the Mercury Bromide
Other Salts that will not
affect the Dry plate,

Have Warths Dry plates
~~These~~ films in Mind and
Plates Made of the Same
of Lead Tin, Zinc Aluminum Magnesium
Copper gold Platinum Silver, Chromium
Zinc, Tellurium Antimony, Bismuth
Tungsten Tin
Mercury Iron Manganese Cobalt
Silicon, Palladium, Iridium
Osmium, Ruthenium
Thallium — Chromate
Sulphide Copper, Etc
Sulfide ~~Iron~~ Iron, Sulfide Mercury
Phosphide Iron Copper
Iron Nickel
See previous page

X Experiments Continued.

Make some printing frame
So slide of Crystal Iodine
be put in, also a Dry plate
photo, w/o paper paper
So large number of slides
Can be exposed at once
Make 50 of them,

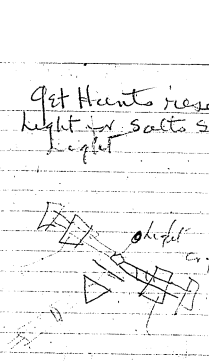
Make some Blueprint dry
plates,
also Bitumen
also Bichromate Gelatine,
find all the other other
that will plate with Organic
matter.
Vanadium Etc,

If it is possible to coat a wire with different salts in rotating them to form filament it would be a great thing.

Take say 36 coat & bring [illegible] crystals apart
12 in strong red light +
12 in darkness
12 in strong blue violet (red) light
12 " " " in arc light
Put the 48 in a suitable [illegible] chamber
Have the 4 of same kind together to permit comparison

For testing [illegible] for photographs a heavy discharge from Buchtel jar discharge should be superior to arc light because can make terminal of different metals, gases than if arc is used + the room for some of parts amazing

Get Hunts researches on light & salts sensitive to light



Y — Yamylene in most of E or X passes thro crystal
" replace same with magnet
use diff [illegible] of salts of [illegible] in light

[illegible]

[illegible]

[illegible] Ethiopia [illegible]

On the left hand [illegible] use of [illegible] tube [illegible] a wire [illegible] with a Crystal [illegible] the Current Vibrations from Coil is passed [illegible] Silicon [illegible] a atom takes place in crystals

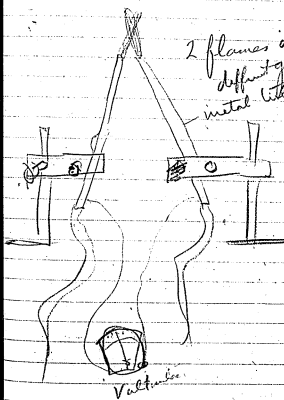
Use the Crystal [illegible] with made of [illegible] a [illegible] Ultra X ray waves to get sounds on different [illegible] which fluoresce [illegible] etc —

Make a Mica [illegible] or prepelling Iodide paper use pin point [illegible] paper + [illegible] use a lot of new salts phenol ft + [illegible] of CLK [illegible] as a X indicating [illegible] get a better quality of paper smooth or regular paper passed through glue or gelatine, with the Salt in Solution so it will never get gone dry but be a Carbonclay by prepe Cobalt + Ni hydrate in gelatine or paper soaked in Ni or Co Salt + prepe with paper by KOH or [illegible]

+ dried, Current makes block
Mn_2O_3 or Co_2O_3 may be
sensitive, perhaps MnO_2 hydrate
+ PbO etc. BiO hydrate precip
on paper with slight KOH left
on would be removed to higher
+ block O_2 + Co_2O_3 may somehow
to a Current,

A phonograph with metal
Cylinder nickelplated would
be better than paper as
the galvanic albumen, magnesium
Silica Soda ~~[illegible]~~ Calcite
films Could be put on by
dipping + O_2 would smooth
then the mark would be distinct
+ have like to concentrate the
Energy — possibly a film
could be found moistened with
a chemicals that would cause
a permanent change in surface
+ permit reproduction of
sound by diff — of
friction, using telephone with
record — or 2 points used
+ Fe + Ni salts used the

recorded + 2 other points
run over discharge the storage
battery —



good - for making X

100 feet of 1/16 wire, made of ~~Iron~~ Iron + Copper braged together to form one length that is coiled so all the Iron is on one side of bundle + Cop on the other, the two Ends come out. Coil is tapered ~~[illegible]~~ 9 - 2 layers of Insulated wire wound over 4 inches of Iron side about 4" on Cop side, the a sort of Mica tube thrown to make X —

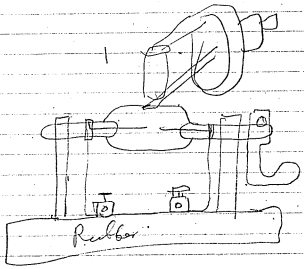
Investigate the Argallaceous smell + Especially from recently fused alumina also pickup silicate of alumina

It may be possible that the Z screws where I put crystals Galvan. one should or both have Easily replaced ends of diffrent metals, as the effluvium may be altered by the X passing from a certain metal into the crystal

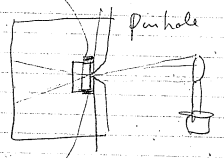
Make all of the X fluorescence by fusion of Crystals together in Crucible

Also make several hundred Salts + double salts by fusing Crystals together

Chl Na + other chlorides
KCy Mattern + other Cyanides
Chlorides, Iodides, Fluorides
Sulphates, Nitrates, etc. should be a great chance here for good
Results for X Ray + UV



Motograph with point running on outside of X ray tube & using either metal or leather fraying or sandpaper stuff or Chalk etc.
To dubes – 2 of which are to be 4 thousand higher than X ray TE no spark can get thro –



Refraction from heavy to light substance X or Electricity stress one or the other & bend the ray thus moves the beam used as a Receiver

Try fill the Thermo Alloys in a shrimp & Bifular near poles of big mag to see if any alloy is magnetic –

Use 500 deg hot plate & Ice water & dash cold Thermo Alloys with various X Receivers with Vibrator in to see if an X Current is made by heat –

Make about 50 tubes

Then exp & fill with fused or dry fluorescin (full) — & sphere tube to X ray stage to outer receiver for X ray waves & incidentally to syst of fluorescent lamp.

Make the several well known luminous phosphorescent sulphides —

Crystalize some of the chromic & platinum salts in the dark & displace in bright sun & take both in dark room & compare —

Try the best thermo alloy Galvanometer & coil surrounded by a coil with strong current also in strong field — also with P pole of mag but not mag pole at (hd) & U.C. Vana,

Try °200 deg 15% sol KOH, with different metals & alloys to get a KOH & a metal junction see degree of voltage if any are found. Try & work up a combination with an alloy or metal whose oxide is insol in KOH,

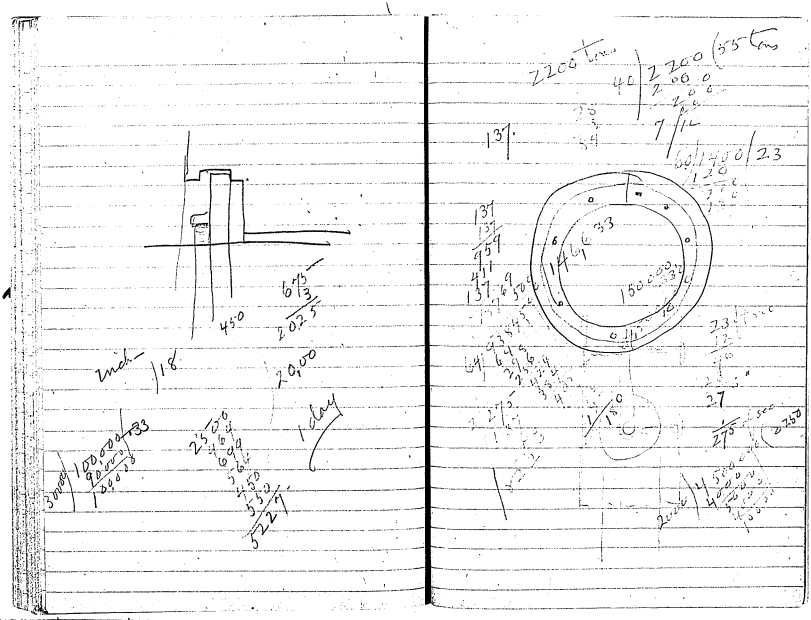
Perhaps a metallic rod immersed in an acid which eats it will have a molecular tremor set up & send a wave out. use a non corrosive metal & test with X Receiver

With Electric furnace
Make a line of alloys of all
Metal, with Tungsten & same
5% proportion as those previously
made,

Also with Chromium
Molybdenum
Iron
Nickel
Cobalt,
Cerium
Manganese
Silicon
Titanium - Rutile etc,

Photo X = Tungsten Oxide in
Connection with Organic Matter
is reduced to Blue Oxide
easily by LIGHT ?

Chl. and 40 } 40
Bromd " 40
Iodide " 40
Cy 40
Ferrocy 40
Ferricy 40
100 acids + 40



256 506

2.715 198 446

1125 318 504

450

450

1125

67

191

251

31 314

2375

2375

1187

1.12

2112

4224

112

2112

4224

446054

1622

125

75

475

564062

506

506

3036

2530

256036

446

446

2676

1784

1784

198916

564

564

2256

3384

2820

318096

Madlin 21 6 3/4

Hima 22 1/2 7 1/8

Mama 22 1/2

Tuffy 21 1/8 — 6 3/4

E 23 3/4

N-02-02-09

21 1/8

169 1/8 π

21

21 1/8 3 1/2

6.75

70

2

198

1847

2495

2.25

314

2900

725

2175

276.50

314

7

2198

314

66

884

1884

20724

[ITEM FOUND IN BOOK]

Laws of the =

Theory Ether –

1st Extending throughout the universe without end are lines of solid matter perfectly elastic & fixed in space, forming a network throughout the universe, except by Gravity

2 These lines are meshed together leaving space between devoid of matter, J

3 The solid ether strings are probably are probably as close together 1/10 the wave length of ultra violet light when there is no current, of the luminous, 1/10 vibration quicker or faster

4 = Were there no matter in the universe but the Ether lines, they would all be drawn to wards Each other

5 = Insertion of matter which is connected to the net work – causes a distortion of the Ether lines so that if a body was suddenly Created it would tend to straighten the Ether lines + this straightening would extend throughout the Universe

6 Different Kinds of matter Bend the lines more or less,

7 Exchanges between one kind of matter

[ITEM FOUND IN BOOK]

7 and another to form a Combination also tend to change the relative amount of slaughtering of the lines.

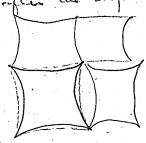
8 – While such a Combination as in 7 is going on the lines are set in Vibration in the act of slaughtering & these Vibrations extend & effect other matter, globally throughout the universe, where there no other matter, they would extend thru' space at once & not slowly –

9 – ~~[illegible]~~

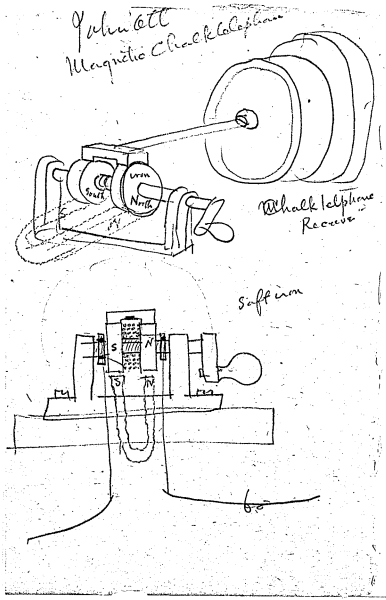
10 – The Creation of a body of matter the size of say Jupiter would Cause such a slaughtering of lines that this would cause gravitation on the Earth to increase to a weighable Extent, the Ether lines in free space would be compressed & hence other matter would be pressed Together with stronger matter tending to proceed to points where the Ether lines are slaughtered –

[ITEM FOUND IN BOOK]

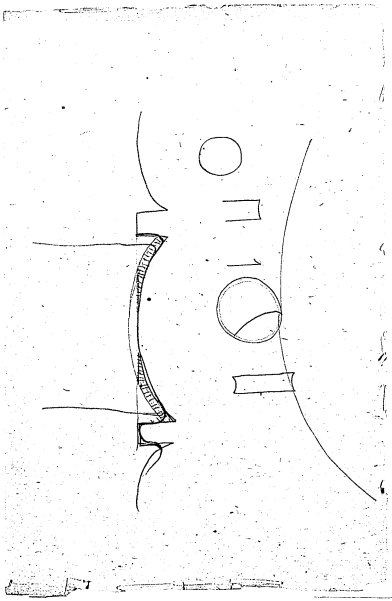
11 Zinc straighten as lines very little,
Oxygen very little but before the Z
Combine a reconstruct is formed within
the Ether meshes that tends to straighten
the lines or produce a pressure throughout
space. The act of straightening causes
every other time in the universe to
straighten also millions of these Combine
takes place per second, waves go with
along the Ether. If the Combin is small that
the straighten of the lines are small,
the number of waves per second will be
small, etc Zn + O, gives more waves
per second than Mg O –
Their temp is simply matter taking up
these waves or by inertia continuing
their long after the original have
ceased.



[ITEM FOUND IN BOOK]



[ITEM FOUND IN BOOK]



Notebook, N-02-03-08

The only dated entry in this notebook is from March 1902. All entries are by Edison. The book contains notes and drawings regarding several experiments that deal mainly with electricity, matter, and electromagnetic radiation. Among the entries are items pertaining to x-rays, etheric force and "xyz rays," and electrochemical recording apparatus. Also included is material relating to an organic liquid battery and the production of battery jars. The book contains 288 numbered pages; many pages are blank.

No 4096
ARTHUR S. BOWKER
MANUFACTURER
95 CEDAR STREET
NEW YORK

Notes

March 8 1902 - J. A. Edison

Sensitive chemical paper for ~~[illegible]~~
recording by current —

Nitrocatechol very sensitive
test alkaline plat pen + open Snt
Chlk + above — H-Side pure free KOH

Pt = Tellurium pen
OX Ferri Cyanide of Potassium + NaCl 1/2 + 1/2
OX Iodide of Potassium 1 bottle gallon — starchy surface

Dry

Selenium point, (Crystals)
Alloy Se + Lead Se 80% Lead 20%
alloy Te 80 Se 20 also Te 50 Se 50 —
Surface coated in vapor with Nickel Hydroxide KOH moist
Chloride K + phenolphtalein — Hydrogen oxide —
Bismuth hydroxide ~~Hydrogen~~ oxide
Bubble pen — ox for reversals, Iodide K + phenolphtalein

Silver pen Chlk organic nitrate compound exposure to light
+ provided develope by hydroquinone etc

New Idea — Use metals for point + base — of same
kind or a solution of the metal [illegible] —
the deposit will scrape off by moving point + deposit
block on Hydrogen oxide ——

OXS

ammonphosphomolybdate + ammonium Chloride (mercury) –
" " Chromic acid – see production of ammonium bicrate –

Zinc + Zinc point in Sulphate Zinc –
also Very amalgamated points, also KOH saturated with Zn_2O

Cu + Cu – Sulphate Cu –

Ag + Ag nitrate Ag –
" cyanide Ag + K –

Pb + Pb – acetate Pb
also PbO dissolved KOH,

Fe + Fe in Sulphate Fe

Bismuth + Bi – Nitrate Bi –

~~Hydrogen~~

Cd + Cd in Sulphate Cadmium –
Sb + Sb in KOH saturated with oxide Sb

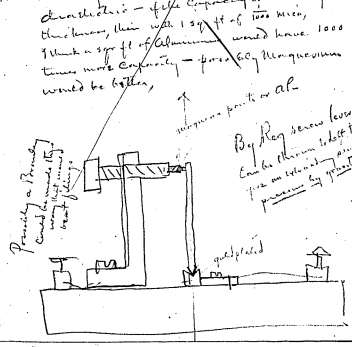
Prussian blue mixture + Cl + K + hydrogen oxide K
drawings, colors

Formation of Sulfides –
Hyposulphite in Sulphides of K – diff methods –

Note two dead flat surfaces of Magnesia ½" sqr
buffed very with the compressor ~~to~~ immersed by the
thin film of oxide when in Contact in one
where the temp is extremely low + yet it higher
temp it will Combust by active friction and so on
~~to~~ formed with sulphur ~~to~~

possibly a weak current on ground with telephone or
would return coupled with induction coils Cause Current conduction
to take place & [illegible] press thro telephone or
possibly a cylinder of mica or plate pass
work in Mellograph — weak currents

Possibly a Condenser of Extraordinary
Capacity could be made with Aluminum
foil alone or Platinum — one piece of foil
resting on the other, the oxide serving as the
dielectric — of the Capacity or directly as to
thickness, their with 1 sq ft of foil 1000 Mfd,
I think a sq ft of Aluminum would have 1000
times more Capacity — press 60 Mergueriums
would be better,



New Idea for a quick Electric clock Box

a 6 strips gold plated, surface between any of these
Photo pinnacles double electric between any possibly
Electrotypes between Zinc copper

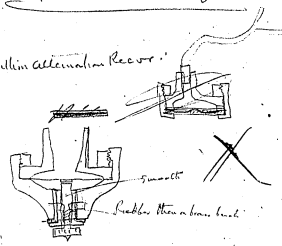
It may be possible that the strips could be
rubbed on any a stone surface across a ~~w~~ ~~be~~

I wonder if a always battery could ~~be~~ be made
with clock long down 1000 ft long wire with wire
straight angles, by long John in making the charging
that a battery,

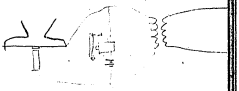
~~Open the of plated~~

Dried paper soaked in strong Sulfate Ni then dipped in KOH, but with 4 cells Bunsen only got poor mark —
Think there was insufficient Ni OH, should be heavy coated or a solid cylinder of the Hydrate — it coated Gel mixed with some Magnesia OH — Dried to a powder — Compressed — then wet with KOH —
Think Eng Clinik says ~~[illegible]~~ — slipped on mandrel Phono with pen on arm 6 3 good way

For Mellin Alternating Recor.



These points to be very fast as they are to be heat within [illegible] of each –

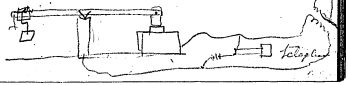


Relay [illegible] when Contacts by each individual stop the rapid alternations, also the Constant Current polarizes the one [illegible]

possibly points of Magnesium or aluminum might work on actual Contacts, possibly the rapid alternations might induce the local Current to circulate – might lay in place of relay a galvanometer – or in Telephone,

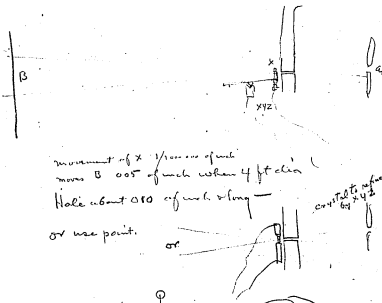
also Oxidized Fe Cu Pb Zn Cd Sn
possibly the [illegible] [illegible] [illegible] [illegible]
If actual Contact will do the Instrument could be pre-adjustable

What might be a better instrument of result is a Effect Current or is not to make a sound in them

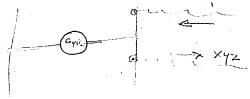


It may want a finer point to
Concentrate the effect of the
alternations,

new Sector

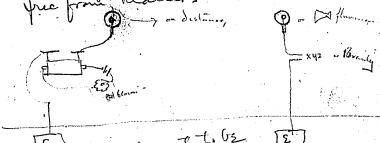


Possibly the pin hole could be filled with a .010 dia plug of a crystal ~~[illegible]~~



XYZ passing thru the Crystal causes the beam of light to deflect,

Possibly an X ray tube is only way to get Crystal with the Ether free from Matter - hence -



Probably matter to be enhanced beyond X
of Rays is beyond X thus XYZ Rays necessary

To make solid blocks of crystalline substances — powder them up & moisten very slightly with some solution after sub & then put them in a great hydraulic press hot — Experiment to get them clear —

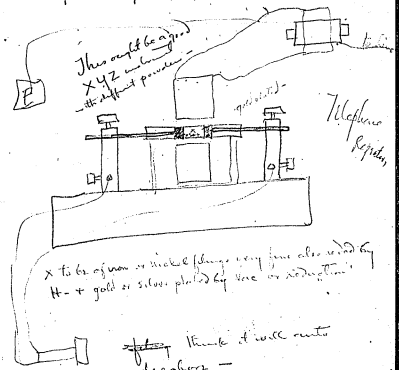
Try large crystal & crush it in mortar — also dehydrate the stuff ~~there~~ is that powdered crystal & then moisten with water & press —

Make chemical alloys thus for exchange

Tungstate of Na —	100 —	di tungstate	5 —
	90	"	10
	80	"	15
	70	"	20
	60	"	30
	50	"	40
	40	"	50
	30	"	60
	20	"	70
	10	"	80
	5	"	90

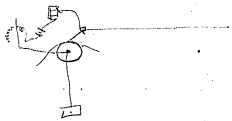
Also on several thousand — 5 from samples

XYZ - + Telephone repeater or new Receiver



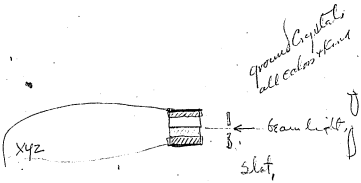
See of Rep Brandly effected by X ray

good — for sensitive chem Jelgh paper
device - thus



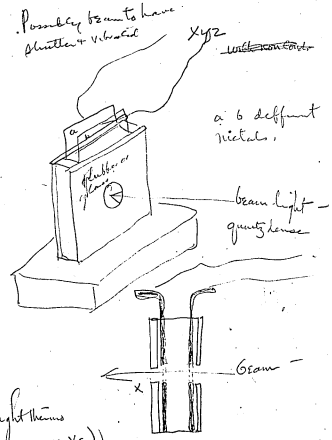
Use a good inductive receiver to a weak current which can be controlled by a necessary & have the current in such a direction that it tends to make a mark but does not quite do so, the incoming current then has not the same work to do for instance if we have a system current to make a slightly visible mark (as preliminary work) then any source producing very much greater results, possibly polarise & shaken down somewhat & then constant current flows more in addition.
Thus obtained more than quadruple the sensitiveness of KI or Fe ferrite,
it with the thread a pen, many wks a telefone

Possibly pens with salts of the same metal might be very sensitive instead of platinum drawing rubber off a block.
Then the pen stones be of some metal!!



Perhaps Thermo Couples which gives no current when heated might give XYZ – use XYZ Coherers or other units, Eliminating vibrating circuit on large number of Thermo Couples.

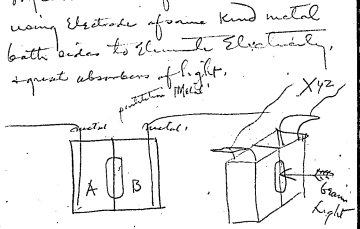
If Thermo good Couples are a question of the Combn of an acid forming metal like Sb with a basic forming metal like Zn & High Alumina cut in regard Their Tungsten with Magnesium as an alloy or Mo with Al Zn Etc of b. gas


Possibly beam to have
shutter + V.V. coil
X yz
a & b different
metals.
shutter or
chopper
beam light
quartz lense
Beam
x
Light thing
(possibly X end)
Electrode solid
no hole to
get total absorption
+ reflection back + forward

OVER

Try. Ether, Sonc Sulfuric – Acetic,
Trichloracetic, Bisulfide Carbon, Aniline oil,
Oil Cassia, Oil Sassafras, Benzol,
Mirbane – Distilled Water, Alcohol, Ethyl
+ Methyl – Chloroform – Kerosene,
Paraffine oil – Butter Antimony + others,
&c.

Try conc solution of salts in Water also
using electrodes of same kind metal
both sides to Eliminate Electrolyzing
+ great absorbers of light.

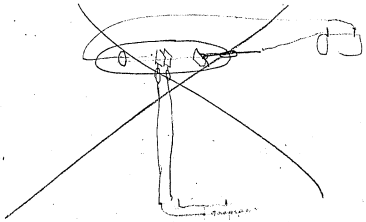


The junction between two dif liquids.

In X Ray Tubes — make several with different residual gas left in —

Make one filled with Oxide Magnesia with Ray electrodes —

Make a tiny Ray — ~~[illegible]~~ — without air —



X47

297
264
33

330
297
33

352
330
22

396
352
44

440
396
44

495
440
55

33)
33

22)
44
44
55

297
264
33

330
297
33

352
330
22

440
396
44

495
440
55

33
22
44
44
55
33
66

396
352
44

528
495
33

594
528
66

660
594
66

704
660
44

Middle C - 264
D 297
E 330
F 352

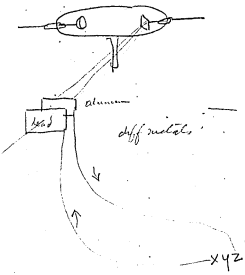


Plate with grounds of Barium deposited on Collodion or gelatine or albumen solution, the crystals will be very fine & stand up sharp fluorescence also good for photographing

X photography –

Cuprous chloride is very sensitive to light – See Watts 1st Sup page 493 also 3rd Sup 1st part 566 –

~~Black paper~~

Bismuth oxides combine together + one double oxide loses its Ox at 130 Cent. This should be worked up as sub for Nickel +

For Thermo make alloys of Selenium + Bismuth Zinc Sb etc –

Collect all the scrap platinum in Lab + make all into platinum Salt Original process C.W.

An Expensive fluoroscope can be obtained by keeping the round Mica disk flat & pouring a few drops of the Concentrated Solution on it & let the water the Evaporate, in most Cases the crystals formed will probably adhere to the surface of solution.

Prisms of fused material Can be Cast between plates of glass at proper angle —

Photo Tungstic acid in presence of organic Matter & Light reduced to Blue —

Impossible heat alloys of alf. metals.

Sulfide Copper magnetic!

Red Thermo alloy to a fine point from the bottom

X Y Z

Cop

Silver

Copper

1/4

1/4

X

1 ohm

1 ohm

Or cut X a vibrator & very sensitive telephone of very low ohms

Possibly on X Y Z

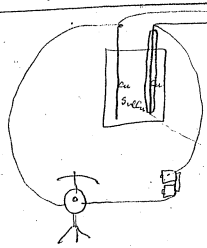
Reason with work

Beet thermo alloy

Silver

Wound balanced to give light pressure —

Palladium will not amalgamate because there is a very thin layer of something over it = Think it could be removed in Bromley by soaking charcoal powder of right size in Chl platt = heat in hydrogen —



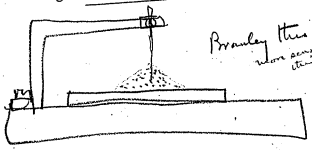
also Zn Zn + Sul Zn + other non p/39

just the smallest possible point exposed —

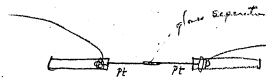
Aluminum point only 1/4 of tops of each exposed. like other large ap —

Dry photo plates, soaked in dark in Sol. Oxalate ~~[illegible]~~ Lithia, dried & then used to photo by arc light should be very sensitive,

Try a sheet with crystals on exposure to arc & then mount — dark box with plate & a pattern see if photos, also see if it goes through opaque paper —

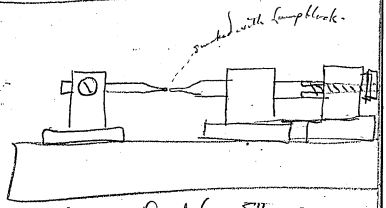


Brasley this way when sensitive stick —



smoked with Lampblack

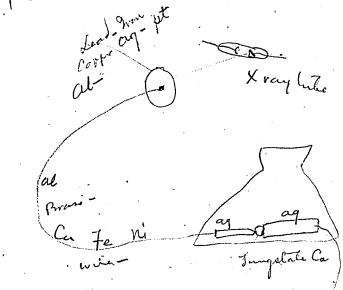
Bromley



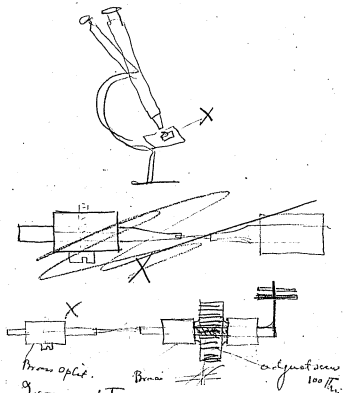
Dark Box Etheric -

Make Tungstates & Molybdates of all the metals the old way by fusion -

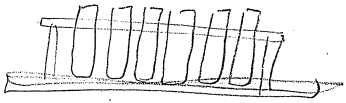
Make sulphides of Ba Sr Ca
Mg Zn Be Thoria, Zr Al etc
by fusion for Luminous or phosphors



Try Thorno on p. 39
material fluoroscope —
also various XYZ
Reactions 100 pt or more long



Thro co to be made very fine with
points dead central + graft points
down to $\frac{1}{1000}$ or less – under Microscope
high power – in Dark box

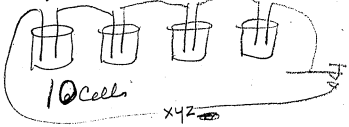


Tray for holding

actual Dyz Cell

See if X ray explodes Iodide Nitrogen
also in Ethereal does it a thing as a Bromide

Generators of X Y Z



Use Bisbow Electrode for one &
following for others,
Silver - Copper - Zinc - Tin - Lead - Iron -
Nickel - Aluminum - Bismuth,
Cobalt, Aluminum, Magnesium -
Sulphide Copper - Tellurium - platt
gold - ~~f~~ Cadmium - Sulfide Iron
Iron coated with scale - Cu with scale
Use following Solutions

Conc H_2SO_4 — Bisulphide Carbon, ditto with Extra Sulphur dissolved, also following dissolved in it.
Oxalic a Chromic a, acetic a, + sulphates of Uranium —

Chloroform — ditto with Resin, ditto — Bromine, Iodine, Sulphur, pyridine, aniline, ferric chl, $HgCl_2$. Kcy K sulphate + Sulphide picric acid — trichl acetic acid —
also all organic radicals with metals + organic bases — Same for all the following —
Oxalic

Glacial acetic acid with following dissolved in it

Chromic acid – Bromine, Iodine, HgCl –
Ferric chloride, Sulphur – pyridin, cerulin,
Trichloracetic acid – K Sulphite K Sulphide
KCy Oxalic

ditto Trichloroacetic acid, with
following dissolved in it
Bromine, Iodine, Sulphur Ferric chloride,
HgCl – K Sulphite K Sulphide
Chromic acid KCy Oxalic KOH

Ether, with following dissolved in it
Ferric chloride, ClHg – Bromine, Iodine,
Sulphur, K. Sulphite, Chromic acid – KCy
Oxalic KOH

Absolute Ethyl - with following dissolved in it - Bromine, Iodine, Sulphur K Sulphite, K Sulphide, Murbane, Picric acid - chromic acid KCy aniline with or without Hg + Cu Sulph oxalic KOH,

Benzol with following dissolved in it - and Bromine, Sulphur K Sulphite K Sulphide - HgCl - ferric chl, Murbane, Picric acid chromic acid KCy aniline with Hg + Cu Sulph - oxalic KOH

Pyridin with following dissolved in it = and Bromine, Sulphur Picric acid chromic acid HgCl - FeCl, aniline, K Sulphite + Sulphide, KCy oxalic KOH

Liquid Chloride tin with following dissolved — it = HgCl FeCl - K sulfite + sulfide, Chromic acid, Trichloracetic a acetic, Bromine, Iodine, Alcohol, KCy Oxalic KOH

Acetone, add Bromine — same as ether | KOH

Aldehyde — add - Bromine,

Chloral Hydrate, add Bromine - KCy

Phenol — add Bromine, Iodine, Chromic acid, Naphthylamine, K Sulfite + Sulfide, HgCl - FeCl — Trichloracetic acid acetic acid picric acid KCy — Oxalic - KOH.

Probably best results will be obtained by CP Benzol — + dissolved Butt. —

perhaps Bichromated Gelatine
will have chromic a reduced by.
X Y Z or Elec + that the oxyd gelatine
is not deoxydized by Ct of Co, it would
act as a Bichromate for Bromley
with a film + 1/1000 much power slowly
moved 1/2 the alternation in showing
work — Think aniline black by
Electrolysis is not reducible effect,
possibly Ferrous oxal iter, + chloride Silver
or a dry plate film —

If aniline, use Hydrochloride of aniline with
some Copper + ammonium Chlorate

See Wallis 2nd Sol 77 Sulphate of aniline.

pyrogallic acid with Nitrite K – O of K oxides
pyro + alkali free use two pour one in bath with the other

also pyro + a salt of lime the free lime causes
pyro to absorb O + blackens also a K salt,

Experiment with proper tinted with all
the aniline Colors + plot pour to see if any
Colors reduced by Current —

for keeping ~~[illegible]~~ films or proper moist
& just not wet enough to conduct + still
appear dry — use, Chl Lithia, Chl Calcium —
Not ammonia; Chl Zn; Chl Mg — use a Chl Mg
little with the Water which after Evapor
leaves just enough to keep proper conducting
The Chlorine will react with H to give free
O for oxdg —

When go back to lab collect all
the chemicals together, put on new
Labels with India ink + also
Hydrofluoric — make sets of trays +
arrange a Catalogue also fill in
Missing Chems from Merck +
Dilaer — Schuchart —
Clean up precision room + put in dark paper

Don't forget to powder up a piece of Each granite, Syenite etc sample in Collection for X fluorescing.

Organic Liquid Battery

Liquid base Acetal

" Acetic acid, in which are dissolved the hydrates of the metals or metal + alkaloids + organic bases.

Chromic hydrate diss

all deliquescent salts are sol alcohol

Nit Mag - prec all Ca, Dichloride Tin, Benzyta, (Sesquichloride Fe Proto Fe Nit Co Proto Mn Cu Ni)

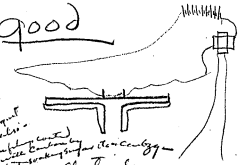
Try the Ethers Sulphuric, Oxalic Ethyl etc, both diffusing Chrome dissolves

also Chlorinated Hydrocarbons with diff Chrome dissolved

Try dissolving phosphides + Sulphides hydrated in the organic liquids —

It is said that a bar of iron held against a grind stone + grooved at the middle so that the ends keeps cool in the middle but so hot at the end can scarcely hold hand on it — unless gale,

good

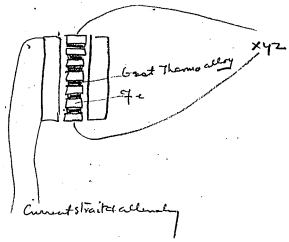


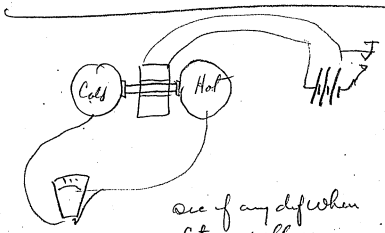
Telephone —

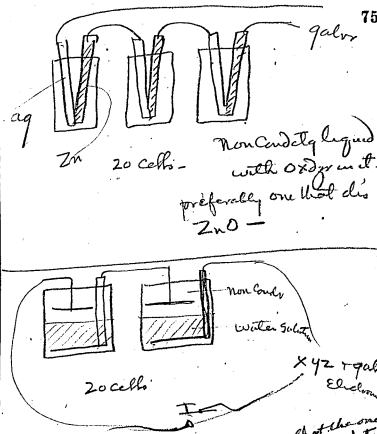
put enough battery or Emf on to cause Branley ag to Cohere

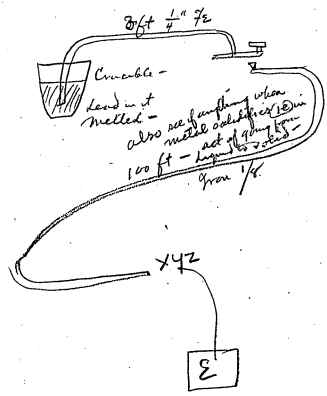
Make Current or rather Emf adjustable, on Talking Each vibln decohere + battery recohere

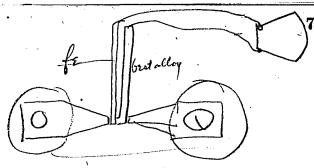
+ so on it should be very loud —


Great Thermo alloy
Fe
Current switched alternately


Cold
Hot
Deflection of amp dif when
Ct on or off

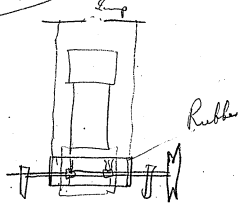

galv
aq
Zn
20 cells
Non Condtg liquid
with oxygen in it
preferably one that dis
ZnO
Non Condtg
water Solut
20 cells
X yz + galv
Electrode
Arrange the Electrodes so that the one
in Non Condtg is very near the Condtg
solution


3 ft 1/4" 7/2
Crucible -
Lead in it
Melted -
also see bumping when
metal oxidized in
100 ft - Length of 9 mm tube
9 mm 1/4
XYZ
E



Big Mag

see if any change when Ct is in big mag



for Organic Liquid Boiling

Chl Sulphur – also with 60 % of dissolved Sulphur –

Sulphur Mon iodide, heating S & I together Even under water, solid melts 60 Cent – probably dal in Organic Liquids –

Crystalized or Metallic like Selenium ought to act like Se with pail on champagne

Possibly in Organic Liquid

Coat, grids of MnO_2 & other

Can be used to advantage as we can make them Cheaply

Boron Nitride heated in a flame phosphoresces with bright green & violet light —

Silicon melts just above the boiling point of Zinc —
Can be cast in sticks —
think I saw in Chem Catalogue
Cheap Silicon — get some or make some for themselves —

Anhydrous Barytes dis in pot methyl al
" Calcium Chl "
" Lithium chl
magnesium chl "

Iodide Methyl good liquid organic Betty
Its infed in Laboratories —

Normal Methyl Sulphite, stable liquid
" " Sulphate "

Methyl Sulphuric acid — no odor, syrupy liquid
forms salts, sol methyl Al —

Nitro methane heavy liquid — weak acid —
Salts very explosive —

Lead Methyl liquid — inflamed in air — ok

Tin tetramethyl liquid stable —

Iodoform CHI, only 0.26% of H,
good to dissolve in liquids —

Note Iodoform dissolved in Bisulphide
Carbon is excessively sensitive to light,
Colored violet owing to liberation of I —

Chloroform only liquid
$CHI-Cl_2$ —

Formic acid — liquid —

following salts combine with anhydrous
Ethyl al it acts as water of crystallization
LiCl CaCl MgCl Mg Nitrate,

Sodium Ethylate (dis Na metal in al)

~~Bo~~

Ethers are the Oxides of Alcoholic
radicals —
Ether dis S, P I Br Chromic oxide
Ferric Chl HgCl. AuCl PtCl
Several other Chloride, Iodides &
Br from salts — acid salts of Ether, all liquids
Ethyl Cl. Iodide Bromide — Ethyl Sulfate (liquid)
volatile —

Oleic acid —
glycerine with dif chemicals
in it —

Scheme —
friction induces p or n in powdered
material, for instance Rosin —
Red Lead one becomes P the other
N — if mixed & blown together
two bulbs one P & other N chgd
the Rosin powder will come on
one & the PbO on the other,
there is a perfect separation
possibly. ore separation process
could be allowed this way
002

Try two balls or glass rods one P other N or Rub ~~Ebo~~ ~~say~~ or shake some Dendroland Conc see if Phosdine is made N or P or if can be accepted —

It is stated that rubbing a piece of ebonite gives Current that it causes the ~~molecul~~ rubbing ~~slopes~~ ~~that~~ it is not due to heat ~~but~~ but to a molecular vibration

~~Isolated Iso Isolate~~ In all liquid non Conductors, arsenic all non Conductors liquid —

Organic Liquid Chlorides

Chromium Oxychloride Liquid
sometimes called Chlorochromic
acid — Mobile liquid boils 118 C
Sol in acetic etc.

Vapor of Chromic Chl passed thro
red hot tube gives violet prisms
of $2\text{-}Cr_2O_3 + CrO_3$ — which
is magnetic = possibly thus
ok in KOH. No CrO_3 reduced to
lower oxide without combining with
KOH.

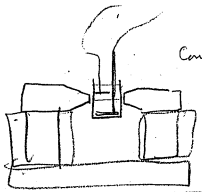
Molybdenum Dichloride Sol in
cold water Sol Alcohol & Ether
Insoluble Mo dis in Ether —

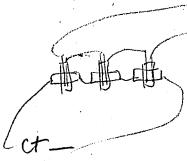
Hexachloride of Tungsten sol
in Bisulphide Carbon —

Tungsten Bronzes Conduct & well
have all of them made in a
proper manner, see the original
paper —

Uranic Nitrate is Sol in Ether

Uranyl salts highly sensitive to light





Stannous Chl dis Alcohol

Tin tetrachloride thin fuming liquid mixes in all proportions with Br_2 & Carb Bisulfide —

Tetra iodide Tin — Sol Bisulfide C absolute alc — Ether, Chloroform + Benzol —

Phosphide Tin Sn_3P
Course crystalline Mass like Cast Zinc Cinder — Thermo —

Vanadium Dioxide V_2O_2
Metal like Crystal Conducts E — Thermo —

Vanadium Trioxide V_2O_3 in powder pressed together Conducts E

Vanadium Tetrachloride fuming liquid –

Vanadium Oxychloride $VOCl_3$
lemon colored liquid (fuming)

Tribromide Sb Sol Bisulfide C
Triiodide Sb. "

I think Rafu should go ahead on reducing Va Cr Bi etc compounds by hydrogen stopping at def points
test same for bolting –

Photo.

gold trihydrosyl decomposes & gives off O when exposed to light

Photo!

Aurous Cyanide must be made & washed in the dark. Sensitive to Light

Chlor-auric acid. Sensitive to Light —

Thermo - Best single alloy - make a lot of it - then make 5% changes with all metals, then, make 5% changes with all the other single alloys which show up fair -

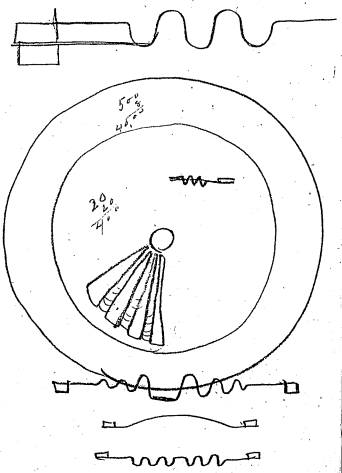
possibly a mixture of finely divided Hydrated Ni_2O_3 with Gelatin, or Albumen, or albumen or Honey on plate would be sensitive to light, might be done cold,

also Iodide of Nitrogen with Gelatin, albumen or Bitumen as emulsion may when dry be decomposed by light, or Magnetism (electricity) or X ray or X42 + thus obtain photo possibly the Ultra red might affect it + thus photo by dark Radiant heat —

Obtain from Foote or English a lot of Rock salt to cut plates from — also Rock Crystal to cut lenses + plates from —

Here is a chance, ~~that~~ by Eye & photo plate, all the slides with Monochromatic Light from the different metals in arc light. Especially Violet (12) metals giving most intense lines in Blue green Violet & ultra,

It is possible with say Magnesium that with very strong light of one refrangibility well found. Specified crystals that will



Br_2 in unison + fluorescence strongly which might not fluoresce at all with absence or weak line due to metal,

See if X ray explodes Dry Iodide Nitrogen —

find a solution which dissolves $N_2O_3 - H_2O$ — possibly a saturated sol of some neutral or acid salt, will do it, try organic liquids — Does Uly decompose it. if not this would answer —

Aluminum	0.40
Copper	1 00
Silver	1.02
Gold —	2.87
Zinc	2.72
platinum -	17.00
Iron	5.20
~~Gr~~ Nickel	6.00
Tin -	6.76
Lead -	15.60
Antimony	15.75
Bismuth	24 40
Mercury	90 00

Reo metals 1 meter by weighing 1 gram

Relative Rho

1440) 4000 (2.77
~~2880~~
1120
1440
1000
~~1440~~
~~2800~~
~~2880~~
~~2~~

57) 1420 (215
114
~~2~~
~~2~~

1440) 13 071 (9.25
12960
1110

1440) 3983 (2.72
2880
1100
1080
~~2~~

1440) 8666 (6
~~5760~~

Watts 1st Sep 56f

1440) 28570 (1580
1440
8200
7200
~~9700~~

1440) 35257 (2440
2880
6420
5760
~~6~~
~~6~~

1440) 9864 (6.76
8640
1440
1440

1440) 2 4640 (17.11
1 440
10 240
10 080
1600

1440) 7522 (5.20
7200
~~3~~ 2 2

Make some or buy some Dry plate Emulsion in black bottles, for use in Experiments -

See Will Ry fluorescence, perhaps a magnetic or Electric Current only applied will Cause fluorescence to phos Continue by heat — Thus gas or fluorescent lamp

Formate of silver decomposes when moist Even in the dark

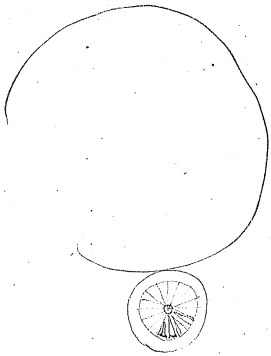
perhaps X42 [illegible] — dark does it

~~Try in dark bottles, or box~~

Formate of Hg does same thing — but Light also in dark

the dark phenomena may be due to Radiant Heat S S S

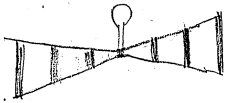
~~Amphibole decomp by pressure?~~

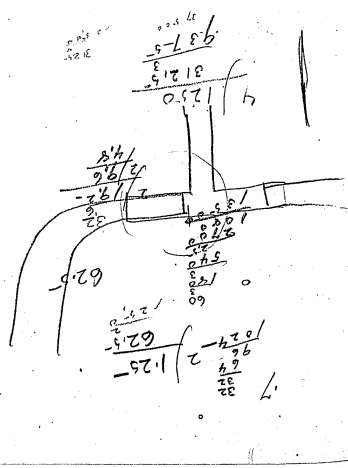


Tourmaline Crystal 116 of book up to 113.
becomes electrical
by heat one end P other N —
its electrification must have very
high Voltage, possibly a
Mixture of fine Tourmaline Crystals
+ a substance which will
fluoresce by E when mixed +
heated would give light —

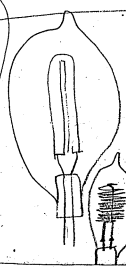
---

pyroelec is exhibited only by
Hemihedral Crystalline form





long chimney filled with phosphorescent crystals or sides phosphorescent by heat below red



glow lamp

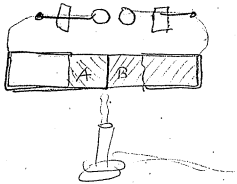
thin sheet metal, coated with cryst. phosphorescent below red heat or bowl of iron or other were coated with powdered phosp material —

Test magnetism of different metals at a red or white heat with pointed poles of Eq mag using wires or a bunsen burner - probably that platinum may be magnetic -

---

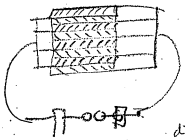
Test Best Thermo alloy Cooling slowly e.g. annealed gomm in mould - see which gives best results.

Clean out Galv Rooms + hire a man to keep it + Chem bldg clean + everything in order put tables, covers over tops of stone pieces, + partition a dark room



I have an idea that pressed blocks of precipitates ~~are~~ like Oxalate of Lime which becomes Electrical by heat, or powdered Crystals, in block put together & coated with metal & heated at puncture or all over one giving P Selec & other N shaped gives platinum-magnesium effects. Especially if a number of them put together

If heating all over will do then disks can be used



Rosin – P

Red Lead – N.

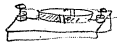
when absorbed rubber

with Sealing wax + Sulphur

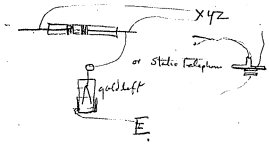
Dry oxalate of Lime when stirred with a glass or platinum rod becomes so electrical it can be lifted out of the cup

Lump of oxalate Ca between plates XYZ comes exactly it & attracts thread —

powdered Tourmaline, Oxalate Ca
ag paste in Vac –



in when X42 or I comes closer – Throughout
by a good Branley with plain ag or other
powder –



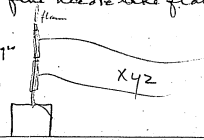
Mixture of Oxalate of Lime with a Resin –
A Condenser with Oxalate lime alone
between,
A mixt of Oxalate Ca & ag powder for jarring

find a fused salt that will dissolve Oxalate Ca

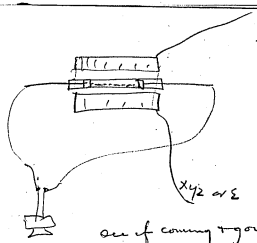
Make Complete act of the Oxalates & double oxalates, & use oxalate Ca as impurity in other fluorescens etc.

Make a very fine high note whistle & arrange that air vibrations pass a narrow passage between two unstrained disks — use material of Brandly. The E or XYZ waves serving to change the quality of the note. This should be very sensitive — use listening tubes.

Make a Cirpellitry of Cross tube through which acetylene gas passes & blow a very fine needle like flame



Insulated outside
Electrified on charge
jet,



on of coming & going of the
Lines of force cuts ag particles makes
a local Current & the whole
~~attract~~ instead of action of
Current direct —

Organic (liquid) Storage Bat.

glycerine $C_3H_5-(OH)_3$ alcohol of a triad radical — al

use CP glycerine (also or) in a non conducting liquid —

glycol ok =

Ferrochloride seems to be a general Organic reagent its soluble — many liquids (organic) + acts as oxygen probably ok for storage.

Ethylene Oxide — "forms the link between Organic + Inorganic Chemist" ~~Unlike~~ its neutral yet a powerful base unites with HCl ~~also~~ as strongly as ammonia, its ethereal liquid boiling 14 Cent, $\begin{matrix}CH_2\\CH_2\end{matrix}\Big\rangle O$

~~Et~~ Diethylene Dioxide —

$\begin{matrix}CH_2\\CH_2\end{matrix}\Big\rangle O.O \Big\langle \begin{matrix}CH_2\\CH_2\end{matrix}$ = Ther boils 102

Crystalize a rapid good Crystalizing substance (with needles) in a very strong moving magnetic field - Have it hot - let it cool off + Crystalize - notice if any different arrangement of C from a duplicate solution not in field but made at same time under same Conditions,

also try 3 or 4 drops on hot glass microscope slide in field + out, Then can examine more closely - might try a number of Cryst + solutions on slides as this is an easy method — also in Compound field — a great many slides could easily be made in Constant field by using pointed poles of big magnet —

Could put 5 or 6 drops on slide with a crystal or so of the substance heat the ~~[illegible]~~ glass to dissolve it + finally to evap. $CHCl_3$ O + recrystalize it all in the field —

Organic Storage = <

fused chloride etc are decomposed by current

no water =

Therefore say Chl Hg dissolved in an organic liquid, with Hg at bottom Cell

a gold or Carbon with graphite mixed with a trickle, which goes to a pentachl.

when chg — This is not an example —

The dissolved active material acts as if fused. The Organic liquid is simple another way of fusing

(14) dissolving it so molecules are free to move — strong solutions should be good Conductors even

when Organic is insulator, it is not necessary Organic should

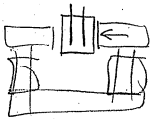
dissociate, because there is no dissociation in fused

Electrolytes — The main thing is the Electrodes to bring abt

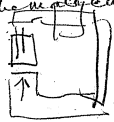
Conductivity —

Iodide of ethyl decomp by light.

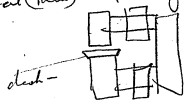
Organic liquid Galvany.



possibly Carbons which do not Conduct might Conduct in a powerful mag field by orientating the molecules —

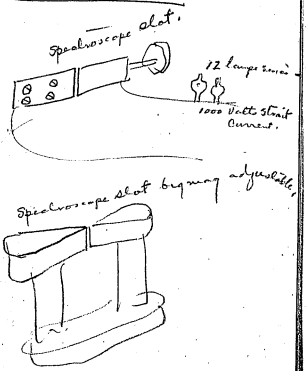


It is possible that Light & X ray fluorescers crystalizing in a powerful Mag field might fluoresce different or loser. It altogether + salts which do not fluoresce might do so. ~~Perhaps~~ Iron dish with paraffine Coat (thin) might be good



Crystalize some Light & X ray fluorescers from every solution. They will dissolve in. —

Crystallize light & X ray flow in a strong static field!



If makes any diff by diff metals to make slot

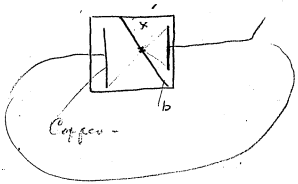
try X + Light fluorescence in a powerful Mag field also 1000 Volt Condenser field — also Hot environment also Cold —

Make by fusion process Uranates of all bases for fluorescence — rares + all — also melted Uranates by Walter Crystlizer

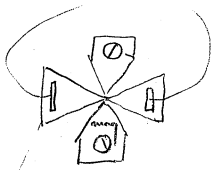
Charge + discharge new Mij Charge battery single grid in Mag field see if any diff —

Make liquid cell & with small spectroscope see if powerful magnet causes changes in the absorption of dif parts of spectrum for dif liquids — Try static field, also try liquids ~~& which~~ with same electrodes & solutions of their own salts where powerful electrolytic action is going on — Try a large number — also alternated fields —

fine slot.

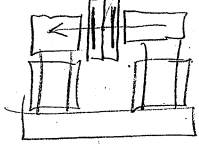


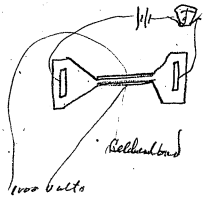
This is electrolytic cell with polished silver in X. The partition b is an insulator with a very fine slot or less, use Copper sulphate so pass current for just little time how deposit is



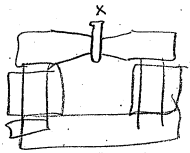
Cell with Electrodes same +
salts of the Electrodes,
alt Connecting both Cells —
.002 with powerful poles of
Mag —

also

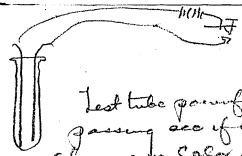




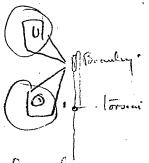
see if solution changes anything



X test tube powerful field
Try Chemical Color reactions see if any change in field



Test tube powerful current
passing see if any
change in color reactions
when current passing



see if robs in powerful field

also put a Branly in
a field (Mag) + see if it
only bitter or worse

It is possible some of the Crystals which Carbon without mixing of Carbon slowly & then put in Lime in a furnace & heat to a ~~the~~ terrible lamp by reduction might go to Carbonado – also Anthracite & Carbon from Sugar & other sources – might do the same =

If I remember right when I first melted things with arc got I had with Widemannstand figures – Hence possibly metals exposed to very high temp might change

It may be that a disk of Rubber revolved very rapidly between the poles of a powerful Mag or having a tube of that liquid which deposit Crystals and Cooling would when revolved until Cold the Crystals might be different in any event the Crystals as they form would be thrown out to end of tube by Centrifugal + Conic phenom developed

In non grid try experiment of reduced iron mixed with ferric hyposulphate —

Try with isomorphous crystals in all the solutions that crystallize in same system — make mixtures also When a crystal has formed in one solution pick it out & put in another & so on until it has been in each solution this should make a compound crystal & do some in the way of phenomenon or X & light fluorescence —

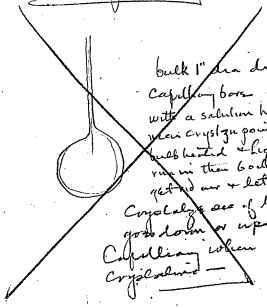
Run a Curve on best thermo alloy & see how E.M.F. goes with the temp —

make a series of Cu sulphides varying by 5% —

Perhaps metals deposited Electrolytically might act diff as Thermo couples also alloys could be deposited. Try see if can deposit best alloy — etc.

Possibly depositing Fe H, & Co in powerful mag field might give diff thermo than if worked in regular way never having been heated

The Lead & tin tree also Ag &
Cd & Zn crystals formed by
Electrolysis - Washed & ~~of~~
Compressed might work
def for thermo also mixture
mechanically of crystals
as in alloy might do?



Co_2O_3 acetate is stable, try mixture of Co_2O_3 acetate & acetate Zinc or Nickel Electrodes, also acetate Cadmium, storage

---

I think Ni_2O_3 is deposited from some of its salts on Electrodes tried which & there was some reaction with Cadmium & use Ni Electrode for storage battery =

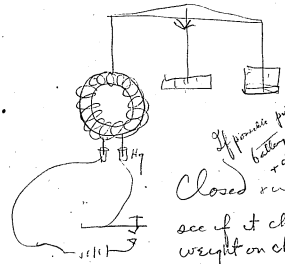
Ferric acetate kept in ebullition of 12 hours, undergoes a remarkable change acquiring a brick red color remaining clear when viewed by transmitted light but opaque & opalescent by reflected light = make small tube full & act on it by fields mag & see if it will change in fields change

(Olivine precip or rather mix NH_3 with Conc Sul Ac. 2 mg to Bromine, heat to 250. C sulph acid all goes off in form of red sulphite – leaving arsenic ox? –

It is possible that a boiling saturated solution of an X-ray or light fluoresces – suddenly poured into large quantity of say a liquid in which its insoluble which liquid is chilled to below zero or over chilled Copper plate would have crystals in a very unstable state + fluoresce better –

Nitrous arsenious acid in hot Hell, left to cool in dark gives a flash of light on the formation of each Crystal —

Especially try all the Iron Salts & Double Salts Crystallizing in powerful Magnetic field & Current stress,



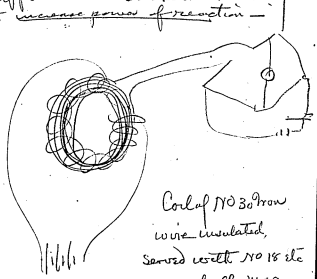
If possible put battery in the pan + drive off by charged balls + charge balls neg.

Closed ring

see if it changes weight on charging + discharging — good

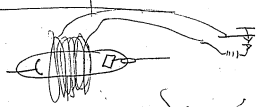
Ether has something to do with gravity —

Large Crystal (turned
bored & wound with
wire - Try several
or many Kinds & get Kick on
galvanometer to see if there are
differences, I make it closed now
to increase power of reaction -

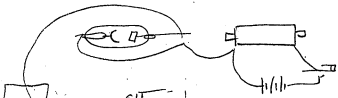


Coil of No 30 Iron
wire insulated,
Served with No 18 etc
to powerfully mag
See what change if this
place on magnet gives
in Rec & my phenomena -

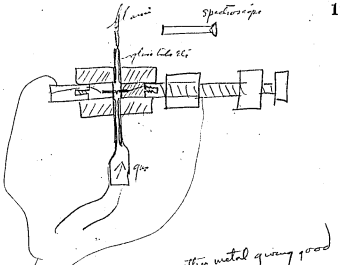
Make X ray bulb - one inch dia
& six ft long - see phenomenon -



X ray Reg surrounded by coil
powerful Ct notice phenomena -



Etheric from
plain Coil see how it explodes
X ray



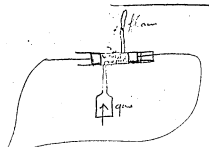
E4 X42 magnesium or other metal giving good

Spectroscopic line X42 or Ct passing across gauze
1/2 from apart — gas gives fine vapor or particles of
metal which carried forward by gas & give
spectroscopic line — thus at to be accurate

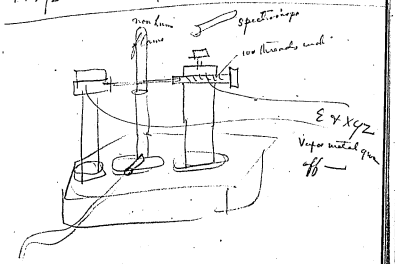
---

possibly two fine points of a Conductive
Sulphide of a metal giving a very strong
Spectral line might do very accurate
HgS — Na Amalgam Lithium Amalgam —
possibly an Arabinate would do —
it should be marvellous sensitive
with a Lithium Conductive Compound

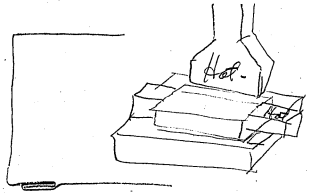
perhaps an alloy of K or Li with a metal can be got — perhaps Te or Ar will do alone,



E 4 X 42



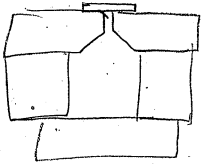
Battery jar —



Three strips of .005 solder then have long heated Copper or iron + bring down full length under hydraulic or screw press - Same with the bottom only high pressure — Na amalgam — afterwards plate,

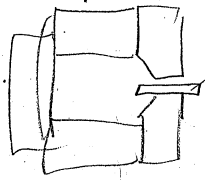
See if flowering crystals still fluorescent — or change — or non fluorescent, also phosphorescence change

plate glass, crystalizing solutions on glass but + cold etc.



use iron plate + crystallize on hot also copper plate. In light + darkness —

Colored + otherwise crystalized under strong stress



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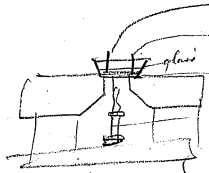


Crystalize in field under Electrolytic action staining — Light & Dark
Try fluorescence effloresce.
also under heat while
Crystalizing also dust Metals,
also plating solutions
porcelain dishes flat also
Metal dish Impartially
also Nickel —

Potassio-Manganic Oxalate
Very easily decomposed by
light + Heat -

Ammonio-Mercuric Oxalate
Easily decomp by Heat + Light

Potassium Mercuric Oxalate
~~Easily~~ decomp by Heat + Light

Most Nitrides Conduct Electricity
make all that do so Conduct
+ try for Thermo, Elec

Gently decomposed Nitrate
Calcium + phosphorus out
(Baldwins Phosphor)

Mercuric Methide has the highest spec gravity of any known non metallic liquid 3.069 — flint glass floats on it, its a powerful alkaline base

Diazonitrophenol
Light yellow powder turns red on Exposure to Light.

also Diazo nitrotetrophenol

Platino chloride of Diazobenzil
Crystals when dropping
Exposed to Light turn Brown

Hydrobromate of Azophenylamine
Explodes violently by
heat friction or pressure

Nitrate of Azophenylamine
Explodes with terrific violence
Exceeding fulminate of
Hg or Iodide Nitrogen,
Explodes Heat 100 Cent
friction or pressure causes Explosion

Azobromophenylamine is a
very dangerous Compound
Unbelighted pressure or even
Contact both very violent explosions,
Causing it to fall off with very
explosion spreading of not
exceeding Azophenylamine

Hydrochlorate of Chloranuline

The Chlorophalenate of a Chloranuline gives crysts that turn violet when exposed to light —

Ethylanilene decomp by Light

Ethylidene-dephenyl-diamine Crysts gradually turn red when exposed to light.

— Sesquioxide Copper (by) as a light salt precipitated mixing Chloride Lime, with Nit Cop beautiful Rose colored sub stable Cu_2O_3 deloude.

Oxalum Salt

Nitroaminic acid crystals get darker when exposed to light —

Ferrocyanide of potash solid in liquid slowly decomp by light giving precipitate Blue —

Ferriday K solution decomp by light rapidly

Nitroferricyanide of Potassium changed by light —

Nitroferricyanide Sodium Solution more sensitive deposits Prussian Blue on exposure to Light,

Dry HgCy w/ Chlorine yields decomposes by light

Evidently there are numerous
Dry prints that cannot
be coated on a glass
plate in a glass cell
containing Chlorine gas
by which photos could
be made by action
of Light —

Cyclamin turns
Brown when exposed
to Light. a solution
in sealed tube exposed
Light forms a white solid

Digitalic acid affected by light

Many organic sub prone to oxidize at slightly raised heat in the dark ~~[illegible]~~ ~~[illegible]~~ not oxidize at ord temp in dark and rapidly oxidize at same temp when exposed to light ~~especially~~ com with indigo Prus Blue Turmeric colors flowers etc Bleached =

Ericinone Crystals affected by light changes Color.

Iodide of Ethyl Colorless — If flowed on Hg & Exposed to Light its decomposed — Red Iodide Hg formed Liberating Ethyl —

Iodide Ethyl is ably a fine Solvent for Sulphur as its decomposed by the Metals in presence of light

Ethyl & chlorine no action in dark — in strong sunlight Carbon free & deposits Charcoal.

Monochlorinated Chloride of Ethyl — Chlorine dissolves in it abundantly — & there is no action in the dark but when exposed to light a violent action starts & Carbon of HCl come off = Evidently Light seem with chlorine has some connection with the Chlorine it not merely the Colour

Chloride of gold in Ether, deposits gold when exposed to light

Ethylene Dichloride of Platinum (solid) – becomes brown or black when exposed to light

Formates of Hg & Ag get blacken when exposed to light, + to some extent even in the dark they are even decomposed by pressure – also heat, formate of silver even turns blacken the dark especially upon moist –

Fulminating Silver blacken when exposed to light —

Fulminates gives light effect in Crystals & will probably be fluorescent like pt cy salts,

Furfural, turns Brown in light & some room in dark —

Gallotannic acid acquires a yellow color on exposure to light,

Trichloride of gold decomposes quickly to gold when exposed to light

Auric oxide reduced by light

Guaiacum, changed by
Exposure to light especially
Violet Light

Acid chromate of Quinine
Rapidly decomposed when
Exposed Light

not but

Perchlorate Quinine, decomposes
phosphorescence

Valerate Quinine when prepared
from Natural Valeric acid
Crystals phosphorescence when
Rubbed

Racemate of Hg colors on Expo to Light.

Hydrocyan-Rosaniline colorless, turns Rose red when expo light

Rosolic acid Rosolates Easily decomp by Expo to Light losing their Color.

Ruthenic Tetroxide, Sol Water, not effected in dark but Rapidly decomp when Expd light.

Santonin turns yellow on
Expos to Light.

Dichlorosantonin ditto

Japan Red p. Brazilwood
Sensitive to light & air -

Ammonio-Mercuric Sulphate
decomp to Hg globules by light
& at 100° decomp in dark
in sealed tube

Metanaphthosulphonic acid
lead salt turns brown by light

Chloride Thallium decomp by Light!

Thymol a product formed of Thymol — decomp by light

Thymol in presence of Bromine is altered to solid pentabromo Thymol!

Thymol in presence Chlorine shew more sensitive to Light!

A Certain Salt of Tin Blackens by light

Acetate of Ethyl in dry Chlorine, Explodes in Sunshine

Chlorine acts on aqueous Sol Citric acid in Light to make Hexachloroacetone

Iodide of Acetyl decomp by Hg in Light

Iodide of Mercurallyl turns yellow in Light

Sulphurous — Iodotrimethide p. 885. Lat. Vol with white Crystal quickly turn Brown Expo to Light

Tungstic acid turns blue on Exposure to Light, poly from joint effect Organic matter in air & Light

When mixed with Organic Subs Easily Soluble is reduced to Blue Ox by Light.

Chlorine water on Benzoic acid in sunshine forming tough gummy masses

Mercurous Benzoate turns light yellow in light

Cacothelene product decomp Benzene by Nitric exposed light turns dark Brown Vol. 1 700

Sulphide of allyl precips Hg precip turns black in light See Watts Vol 1 144

Arsenate Cu + NH4 decomp by Light — Vol 1 381 Watts

Heat Phots } Di mercurous arsenate, precip changes color by heat

~~Heat Phots~~ } Sulphantimonite of Sulphoethyl powder changes color by heat

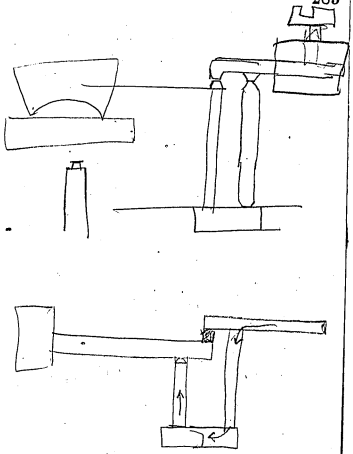
Monochloroacetic acid
action Chlorine on Acetic
Even in cloudy weather &
slightly in dark.

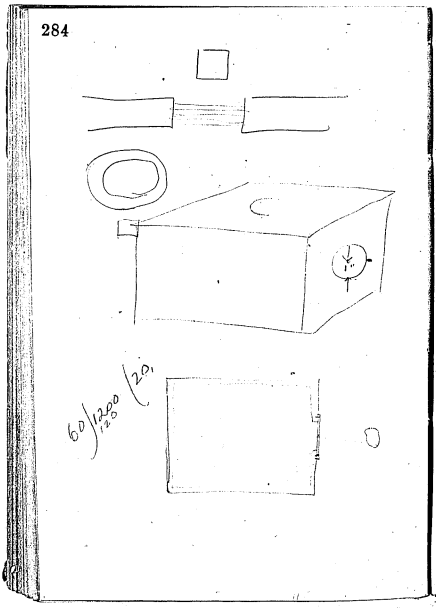
5 of acid Chromate Pot
mixed with Water or Alcohol
deposit Brown sediment in
light but not in dark

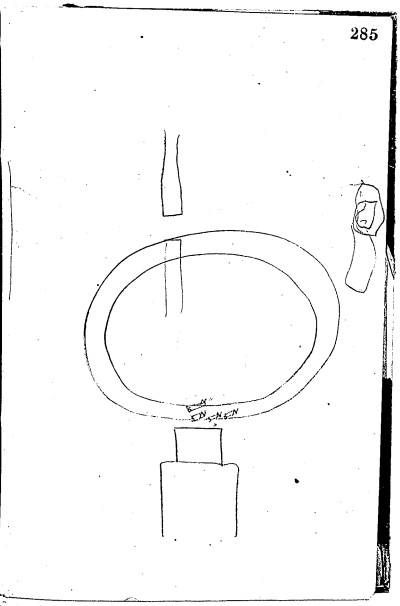
Phosgene gas, action Chlorine
on Carbonic oxide in light,
forms Chlorocarbonic acid

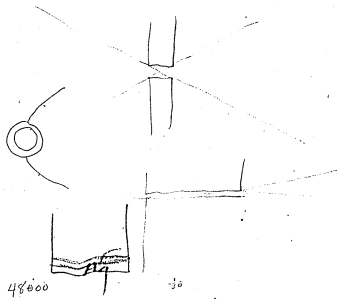
If plate in Camera with a
Coloured Compound, the
acid would be formed by the
light of the exposure & the
acid would discharge
the Copper & muddle plates

Read for Light Vol 1 445




1"
60 | 1200
120
20


CONCRETE



48000

4·80 ft

480

·005

60) 1400 (23 ft

120

200

4" Long

256) 1400 (5 ft

1280

4000) 14000 (3

186 000

53000

558000

93000

1478

32

12

64

384

3964

7484

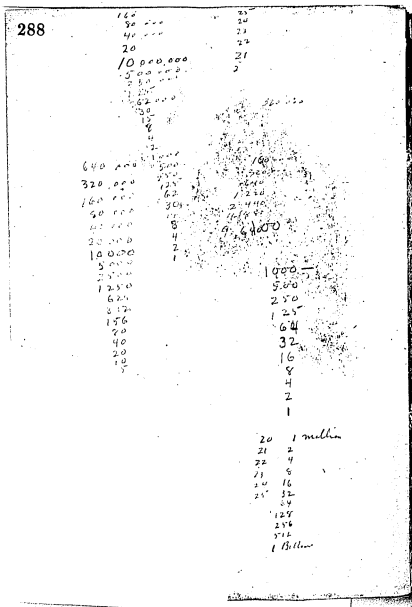
2957

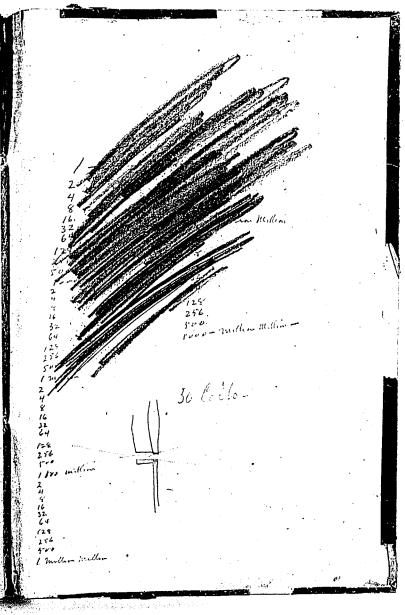
37485

400,000,000,000

1000) 900000

4000


640 000
320 000
160 000
80 000
40 000
20 000
10 000
5000
2500
1250
625
312
156
78
40
20
10
5
1000
500
250
125
64
32
16
8
4
2
1
20 1 million
21 2
22 4
23 8
24 16
25 32
64
128
256
512
1 Billion


Million
125
256
500
1000 Million Million
30 Billion
1 million million

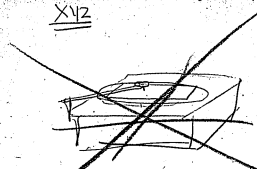
Notebook, N-01-01-02.2

The only dated entry in this notebook is from March 1902. All entries are by Edison. The book contains notes and drawings regarding several experiments that deal mainly with electricity and electromagnetic radiation. Among the entries are items pertaining to x-rays, etheric force and "xyz rays," thermocouples, and electromotograph apparatus. Also included are scattered phonograph drawings. On the last page is a list of mine properties in Canada. The book contains 61 numbered pages, some of which are blank, followed by approximately 20 unnumbered pages.

4"

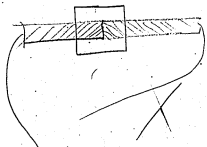
This book
Mch 9 1902

XYZ



~~Use that talking machine arranged with defect sensor~~

Thermo



a ferrule of a metal having a very small Expansion is reamed out and the Thermo Couple are ground to size that gives fit when Cold. On heating Thermo Expands more than ferrule & thus under Compression [illegible]

~~Try compin~~

Try mixture of the salts of a good Thermo alloy ~~reduce~~ by Zinc + Compress also plate the alloy if it will plate!

See if passing 100 volt thro' ~~you~~ Crystal, liquids any become luminous in the dark -

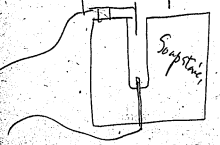
put in ~~sealed~~ tubes cold ~~saturated~~ Sol of salts add some Extra. Seal then heat to dissolve Extra Crystals + then Cool at a Certain point Crystals be formed under pressure

Crystalize some hot saturated
sol of Cyanocyanide of K
the fluorescing kind under
powerful X ray – see if it
increases its power or lumines
also Nit Uranium & Benzoate
which is best & other fair ones
also the Oxalate of Lithia to
see if X ray changes its
character as light fluorescer
also Crystalize Mixture of
Oxalate Li & Cyanocy K
& also Oxalate in platinocy Ba
& other X ray fluorescing
see what effect it produces
as X & light fluorescer

Try some pure Stobie or on Thermis, Melt & Cast some also, it melts wonderfully Easy

Try casting best thermis alloy in powerful Magnetic field. Try with Iron moulds & with Brass Mould, also ~~plate on~~ on soapstone —

Also try Soapstone with wire in bottom & top with 10 or 15 ampere so when ~~solidifying~~ the current will pass thru. May change Crystallization,



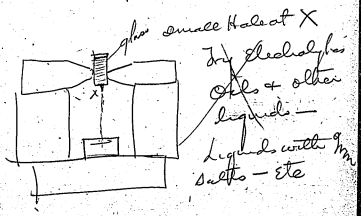
also with 256 Tuning fork hall up & Balidfy

For thermo make the 5% act of all the weak forming metals with the Base oxide metals, —

If there is anything in it, ~~[illegible]~~ Cr W U Mo and Sb S Te Se [Si shows] be good with Mg — Hg. Fe. Ni

---

See if viscosity of a liquid changes when in Magnetic field (powerful)



Also with very sensitive Hydrometer —

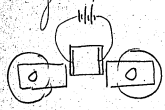
Try pressing out flat test of the thermo alloys to see if destruction of crystals affects EMF —

Stress Tourmaline (crossed to be opaque) by Magnetism & - alternating X | X Ray + see effect on light.

Resume our makeshift very fine Ca tungstate mixed with ~~[illegible]~~ any powdered tungstate 1 of Calcium to 2 of tungstate 100 to 600 mesh fine + put on paper for making sharp X ray photos

Do something with the phosphorescence to get sharp photos — the prevent light from proceeding from particles & particles & things get hazy definitely

Get glass defraction grating say 3, or 4000 lines - flash with Silver, then gold, then plate in Copper bath & strip from glass.

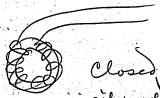


square cell with Cop sulfate

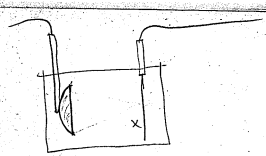
Silver solution Electrodes

battery cell

placed underneath in potential field of mag & plated on by weak Current, see if more on one edge than the other,



Closed gun ring in oil under hydraulic pressure get throw on gelatin with pressure on & pressure off



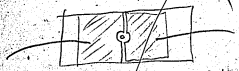
Electrode of Copper Concave & focused on silver plate X
Slight Current, Shellac back-
ace of Electrolytic lines can be
focussed

Slightly acidified Solution of
Pot Iodide is sensitive to light —

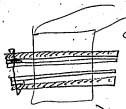
Through a powerful field
may
drills in Vacuum

See if paramagnetism of iron is destroyed in Mag field
use polished iron plate -

Use pin head drops of crystalizing solution on polished clean glass under Microscope
1st crystalizes - dark
2. sublimed.
3d glass electrically charged by tin foil all should sing -

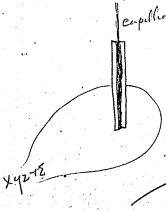


4th Gas powerful light,
5 sudden by heat
6 in presence of various non crystalizing substances
7. in different solvents -



2 tubes loosened app direction opposed
1st try not Torsion then twist pin & try

Reading – Phelmon that diaelectrics
Expand on stressing & dependent of
change then XYZ & Σ
Recover time



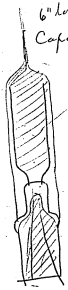
Cell with silvered plates
+ distilled water
or non conductor organic
Capillary changes

OVER

A better device

1st get Vac. then break capillary under top of liquid

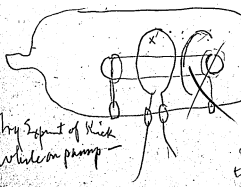
6" long Capillary



Top view

Iron Cup – Silver wire x determine Kick with without Vac

Vac must be so good not prime



try Equipment of Kick without pump

use Sapphire

Build with pyrex

Sapphire pyrex to deliver Vac

Battery Cell —

In the joints of seam place a strip of silver solder Melting about at yellow then put in closed chamber ~~pass H~~ + melt the solder —

See last pages this book in re action of tellurium pen —

Crystals Oxalate Li + X ray fluorescence in Chlorides of great solubility also other salts of great solubility to see if crystals change — also from diff solvents + in presence of diff things also rapid + slow crystallizing

Plate Cobalt on iron

" Copper " Possibly can 1st plate Copper on iron & then plate Zinc & when hot they will alloy & produce brass & precipitate iron

" Brass "

Silver "

Zinc "

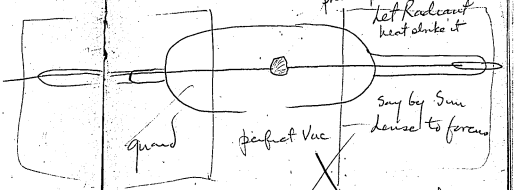
Cadmium "

gold

Then put in chamber heat pass H & weld the metals to iron

Think all will ~~stand~~ a yellow & probably alloy

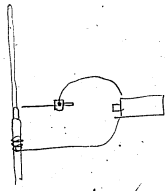
Try plate ~~[illegible]~~ iron wire with platinum by heating chloride, then put in chamber pass H & heat high take out & drawn down very gradual & give to Dally to see if can use for Lamps



This will show if radiant heat ~~gives~~ perfect Vac & make Crystal phos –

Rig up sensitive balance for weighing so scale beam on one end is in the Cyc field of large Mag see if weight of diff substances ~~same also~~ Hot Saturated solution closes to pur which on cooling Crystalizes whole field is on see if change of weight

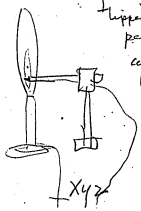
Sensitive flame



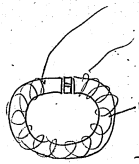
Sensitiveness is at the orifice of burner
make short fine + connect spark coil
across also use electric spark —
also two pieces foil on a glass tip +
C etc by various devices to alter flame —

Mercuric

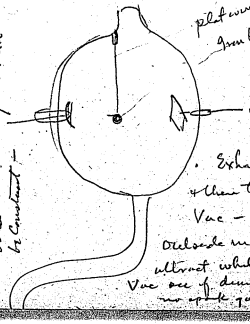
Double Iodide of Mercury
+ Copper blackens at 70 Cent
Painted on paper + stuck C
blacken — Heat photo also
heat of electrolyzer, paint pentachin
paper try of blackening by C+H 2
etc



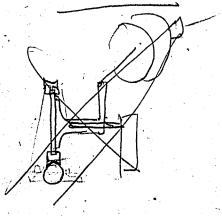
Get some 1 $1\frac{1}{2}$ + 2 inch
graphite ~~adhesive~~ ~~Carbon~~
for Electric furnace



over gap - take Kick & then insert the bulletin made for Heating - see if any automatic changes Kick -



Best Thermo Alloy –
~~from~~ 1st test, then put under practical hydraulic pressure – Retest, also one end pressed, other not, also press several alloys, also iron to iron, pressed other soft –



Make in addition to several hundred Chalks also make chalks or rather Cylinders for use in Emery of all the Metals, a great many Alloys & Phosphides, Sulphids, Arsenides, Tellurides, Selenides & Conducting substances

possibly platinum point rubbing on cylinder of brass Thermo alloy etc will act by current to give diff friction —

Possibly the Magnetic closed ckt Emg will be very sensitive if laminated, & permanently magnetized,

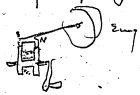


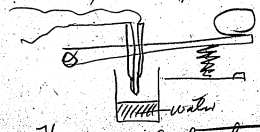
Diagram Emg with a disk of glass or other transparent substance

This disk rotates pressing against it is a metal disk connected to Emg — a ray of light or heat or X ray etc striking the friction surface through the glass changes friction might be sensitive trapped

XYZ Received —

Use small dry plate photo plate interposed in dark cover between plates of a circuit over which XYZ proceeds —

~ Heat a bow of wire, def metals worked by key & dipping in water & heated by balling



The sudden contraction, sending

an XYZ wave heat by
blowpipe also use
iron Ni Co, Zn Cu pt
Pd Ir Cd & other metal
use ellis XYZ Receivers to
detect waves —

Some phenomenon shown
Come out of passing
waves through junction
of Zi + Tinplate or
Magnesium + Tinplate
the lightest & heaviest
metals —

By making a thin plate
Celluloid say 2/1000 about
4 X 4 covered with disks
of metal say 1/2 dia ~~Then~~
~~a~~ making ~~a~~ each disk
a seperate metal of all
that can be got in disk
form & then laying the
plate of disks over a
dry plate, but which is
thin black paper - we
get an X Y Z theory
the wire carrying X Y Z
being connected to each
disk for 10 minutes
~~I shall~~ test this with
all connection of X Y Z
1st test by leaving

it 24 hours on plate to
see if metals themselves
give any Rays — also
24 hours after metal
been Exposed to arc lite
lamp for 1/2 hour —
if nothing go on with
it as XYZ Rays —

See if Nickel will
displace Cu as a
Commutator bar —
use brass wheel &
heavy spark using
battery & done with a
magnet —

It is probably that a 30 or 40 ampere arc light in a magnesia block with hole to let rays out & a shutter rapidly whirled with say 1/2 doz openings with quite intermittent rays that will affect an XYZ Receiver — perhaps light & heat rays would neutralize XYZ Rays therefore between shutter & beam interpose heat & light screens — also try without Rotating shutter for

instance try all slides
to see if fluorescence to arc
ray through thin black
paper — ditto the sunflower

d

30. 16- 75— 200

75=
400— 5 farmer 36—

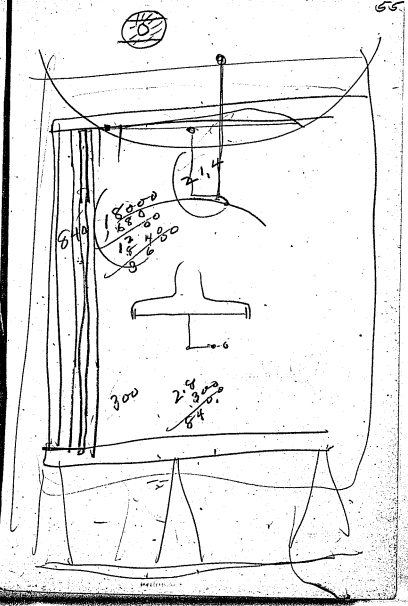
850
870
290

79—
12
58
79
94
150
109

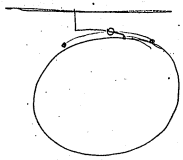
1100.

40000
40001

20000
163
1840

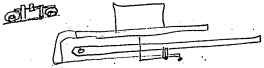


1 000 000 workers paid
2 million dollars, produce
stuff that sells for 3 million —
~~The Whence be [illegible]~~ if
where is the Extra million coming
from, as most of the stuff is
sold to themselves,



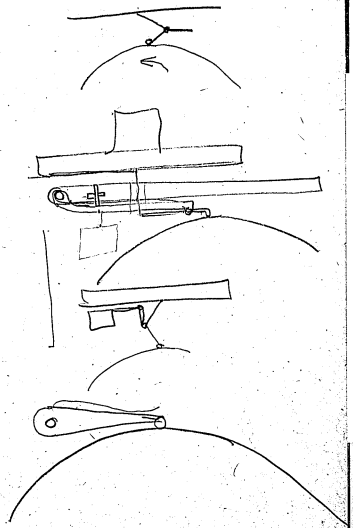
60) 1120 (18,11 second
60
520
480
40

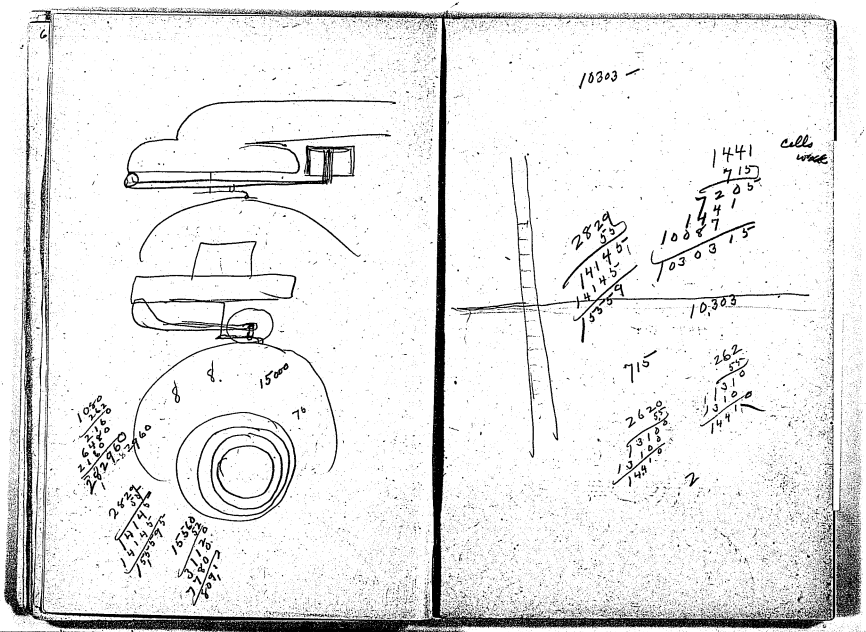
400) 18000 (4,5
1600
2000
2000



4000 - sec

7) 160 -
12 8

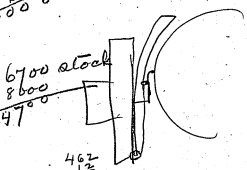



10303
1441
715
205
141
1087
10303.5
2829
573
1414.5
1414.5
1359
10,303
715
262
53
31
10
149
2
8.
15000
7°
8
1050
210
840
168
672
2829.00
2829
573
1414.5
1414.5
1359
1553.00
310.6
1242.4
1242.4

1441 cells —

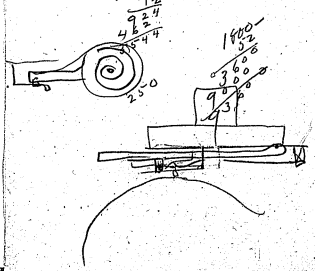
464
205
8646
5764
6700 65

6700 stock
8600
147 00



462
12
624
462
54
250

1400
32
36
3600
900
136



105
3
130 —

826 —

925

150
3
450 —

28
8
84
20
144

979
148
489

160
89
247
144
105 —

105) 21000 (200

200 Kosh.

14
39
126
126
54 40
0
21,080

446) 2,47
360
86 0
14 0

5146
40
21,84

21600

247
84
988
976
207,4

980
80
49 0
784
833
297 65

980
833
1,47
120
294
147
1764

207

3900
1400
39
260
126
140 42
32 54,6
280
280
0
7

52 mix-
14 flake
66

12) 462 (38 400 60
36
102
840
420 0

979
52
9,27

1,17

20

14
20
35) 285
245
3 0

7,7) 1400
140
20
420
84
28
140
14
28
42

1,750

1079-
60
1,013

175
1000
225
240
1640

14
33
42
42
140

5

1400) 1640 (1,17
1400
240
140
1000
980
20

1400
70
840
140
2,94

700-

12) 182 (15
12
6

1400
1079
312.1

1040
320
1400

14
5.5
70
56.0
63
105
35

14
4
5600

1680000
168000
20000
2

320

3 in 10 hours $\frac{10}{1000}$ thick
6 in 20 hours

45

50 grms per hour

6) 50
83

30

40.

89

190

12) 512 (42.66 1 ft sqr
48
32
24
80
72
80

50
40000
2000000

42.66 lbs 1" thick

18732 grms

$\frac{1}{1000}$ 18 grms

$\frac{10}{1000}$ 180 grms

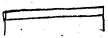
446
42.5
2230
892
1784
189.50

446
42
892
1784
1873
1000) 1873 (1.873
1000
8730
8000
7300
7000
300

18"

6 in 24 hours 10000 daily

6) 10000
1666 –



12 ft.

Drums – 2 ft. deep – 3 ft dia – 10660

18 on each –
108 –

100 per drum –

100 drums 10000 –

15) 260 per
1300
1300
1
260 000

156) 260 000 (6 8

26 156) 10660 (68
936
1300
1296
36

500 ft 1 Row – 5
250 2 Rows 10
125 4 " 20
62 8 – 40

10000
300100

300.

5750
1725.00

57.50
17.50
7.50

50

1340
4.
536.00

48.
30
250
60
22. 1500.00

1340
536
1876
20
3752.00

100
54
46

1876
375
2251

2250
25
1125.00

100
40
50
20
25
50
5.00
1.00
50
50
1.00
75
25
25
25
20
20
25
40
25
50
20
1340

2250
3500
37.

100.
100.

5.

225
50.
112.5

5890
5.90
589.9

712.50
536
20
589

5890

1340
3500
484

.48

1104 — 11 75 Rule
2nd — 11
3rd 11 3rd Run 15d

1103 — 9 Dip 1099
2nd 10

1102 10
2nd 13 "

20% 75 Rule i

1066 6
2nd 8 "

1064 7
2nd 7

1065 — 8
2nd 6

1063 11 2500 — 20% 75
2nd 11

12 / 106 (9
108

72 — 20% 75

13
13
11
11
9
9
10
11

1057 — 9
2nd — 9
3rd — 9

1054 — 3
2nd — 3
3rd — 4

1058 — 8
2nd — 10
3rd — 10

10% 75 Rule
1st 2
3rd 150 Rule,

1056 — 4
2nd — 4
3rd — 4

1059 — 8
2nd — 8
3rd — 9

10% — 7

1053 — 7
2nd — 7
3rd — 8

10) 12 8 (1

1098 — 10
1099 — 8 Days 1093 except rain 10%
1100 — 9
1101 — 8

1097 — 10
2nd — 10

1096 — 11
2nd — 11

1095 — 10
2nd — 10

20% 75 Rule

1094 — 13
2nd — 13

1093 — 14
2nd — 13

10) 11.7
1.4.7
9 —

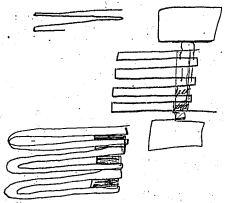
X42

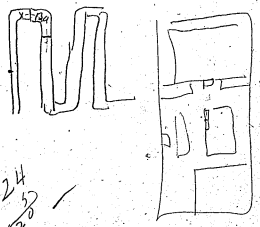
Tellurium pen gives a dash like this no matter how long

Current kept on – This is strange Especially as there should be no polarization on account of the moving paper – it's the Hydrogen pale, Why does it Grace – perhaps – its not the effect of Elec – to test this See if Le Monac can be failed out by adding Condensers to a Resistance, Try and get smooth paper or on plumbum Hydrate surface on a phono

This is queer

Thorne	9	McLennan	7
~~Brayton~~ Brown	16	Caprol	8
Dennison	2	Bowell	10
Graham	16		1
Walters	2	Foy	
Trill	10	Wiener	18
Totten	2	Norman	20
Crayton	2		217
Snyder	7		57
McKim	1		160
Cascadan	6		
Dowling	5		
Bleggard	15		
Fahenstock	10		
Garrard	17		
Morgan	20		
Levock	10		





24
37
50

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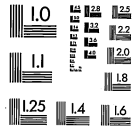

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